



**lewis bradford**  
CONSULTING ENGINEERS

## **NOVOTEL CATHEDRAL SQUARE CHRISTCHURCH**

### **STRUCTURAL DAMAGE REPORT FOLLOWING 22/2/11 EARTHQUAKE AND SUBSEQUENT AFTERSHOCKS**

#### **CONTENTS**

- Structural Damage Report
- Appendix A – Floor Plans and Photograph Layout
- Appendix B – Repair Schedule
- Appendix C – Damage Register
- Appendix D – Photographs
- Appendix E – Structural Drawings
- Appendix F – Previous Reports
- Appendix G – Geotechnical Report
- Appendix H – Sika Epoxy Injection Specification
- Appendix I – Peak Ground Accelerations for Christchurch CBD
- Appendix J – Building Level Survey Results

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## A. Introduction

Following the magnitude 6.3 earthquake that occurred in Christchurch on the 22<sup>nd</sup> February 2011 Lewis Bradford Consulting Engineers have been engaged to carry out a detailed inspection of damage to the structure of The Novotel Cathedral Square in central Christchurch. Lewis Bradford are the original building design engineers and were involved throughout the construction of the building until completion.

In addition our Director, Craig Lewis, has carried out previous inspections following the September 4<sup>th</sup> 2010 and Boxing Day 2010 events. Our reports from these events dated September 17 and January 19 2011 respectively are attached as Appendix F. It is notable the relatively minor damage which had occurred due to these earlier events.

At the request of our client Host Hotels & Resorts, Inc. this report has been prepared to document the extent of the damage to the structure, up to the date of the inspections, and to include suggested repair works for the structural damage.

This report only covers the tower, and does not include the historic Warners Hotel.

## B. Background

At 4:36am on September 4<sup>th</sup> 2010, the greater Christchurch area was struck by a large earthquake centred to the south west of Christchurch near Greendale – close to Burnham.

The earthquake was quite shallow, centred approximately 25km from the Christchurch Airport and was of magnitude 7.1 on the Richter scale.

This earthquake had a largely north/south orientation in shaking as experienced in the city.

On Boxing Day a large M4.9 aftershock struck the city, centred very close to the city and with a distinct west/east orientation.

A further large and very damaging M6.3 earthquake struck the region at 12:51pm on February 22<sup>nd</sup> 2011.

This was centred near Heathcote, was relatively shallow and due to its proximity to the CBD was very damaging. It has resulted in 181 deaths, several building collapses and hundreds of building demolitions will result. It had a predominant west/east orientation.

Also a further M6.3 aftershock occurred on June 13<sup>th</sup> centred near Sumner.

Between September 4<sup>th</sup> 2010 and the date of this report, there have now been over 7,400 aftershocks of magnitude M2.0 or greater.

As well as the major M7.1 and M6.3 events noted above, there have been a further 28 M5.0-5.9 aftershocks and 308 aftershocks between M4.0 and M4.9; centred around or between the Greendale and Lyttelton faults.

Whereas these earthquakes have been undoubtedly large, damaging and in the case of the February 22<sup>nd</sup> event deadly, they are not the 'big one' expected from a rupture of the Alpine fault, expected to produce a magnitude M8.0 earthquake or larger. The shaking from this event will not necessarily be greater than the February 22<sup>nd</sup> event given its greater distance from Christchurch, but the duration of shaking will be considerably longer.





We know that in certain parts of Christchurch the shaking on February 22<sup>nd</sup>, albeit of short duration, was equal to or much greater than our current design codes at the time.

However exactly quantifying how the actual shaking experienced by a building compares to our design codes is very complex, and a function of (amongst other things) specific ground conditions under each building, duration of shaking, peak earthquake pulses, the specific period of the building and the like.

We have included a map of central Christchurch as Appendix I just to show the huge variance of peak ground accelerations recorded in and around Cathedral Square on February 22<sup>nd</sup>.

This shows recorded accelerations varying from 0.30g (which is above the previous design code baseline) to 0.73g, and highlights the significant sensitivity to ground conditions.

Even defaulting to the two closest records (Police Station and Christchurch Hospital), shows that the recorded peak ground accelerations on February 22<sup>nd</sup> were well in excess of the previous code spectra levels. A correlation with the Police Station is approximately valid in our opinion given the 'similar' ground conditions.

### **C. Ground Conditions and Building Level Survey**

A comprehensive Geotechnical Interpretive Report was prepared by Tonkin and Taylor in November 2006 and was used for the original design of the foundations. Site soil category Class D in accordance with AS/NZS1170 was used for design.

A further report summarising the results of a geotechnical post-earthquake assessment and review of the Novotel Cathedral Square site was completed by Tonkin and Taylor in July 2011. This assessment included the site drilling of a new borehole along with a review of existing site investigation information, preparation of a geotechnical model and liquefaction analysis and updating of geotechnical parameters. A brief summary of the results of this report is outlined below:

The Novotel Warners site is underlain by sandy gravel, sand and silt to a depth of approximately 24m below the existing ground surface, overlying, dense to very dense sandy gravels. There is a low to moderate risk of liquefaction in the soils underlying the site in a future ULS event. Estimated liquefaction induced total settlement is approximately 0-10mm under a ULS event.

Refer to the Tonkin and Taylor report titled 'Geotechnical review and assessment for Warners Novotel' for full details of the site investigation and modelling work undertaken in June and July 2011. (Refer attached Appendix G).

We do not believe the recent seismic activity to date has impacted detrimentally on the founding conditions for this building.

An overall building level survey has been completed by Eliot Sinclair (Eliot Sinclair were the original building surveyors during construction of the Novotel) in June and July 2011 to assist in the completion of the geotechnical report and to aid in the overall building assessment. Floor levels were taken at levels 3, 5, 10 and to the soffit of the ground floor along with three dimensional levels of the 4 external corners of the tower structure.

The levels taken at floors 3, 5 and 10 varied considerably due to the varying surface finishes (thick textured carpets and/or tiles) and some pre-existing out-of-level construction related floor tolerances and no reliable levels could be reviewed. Thus to obtain more reliable levels the underside of the concrete ground floor was surveyed. These ground floor levels indicate up to 46mm of differential settlement across the building footprint. We believe that this level of



settlement is in line with expected construction and gravity load settlement of the ground beneath the building although a very minor component may be due to the recent seismic events. It is also noted that the overall global settlements of this area of the CBD are in the order of 130-140mm which is consistent with the movement of one of the survey datums located in Cathedral Square which has dropped 133mm.

The three dimensional levels of the 4 external corners of the upper level tower structure indicate that the north-eastern corner is 64mm out-of-vertical towards the north, the north-western corner is 68mm out-of-vertical towards the north, the south-western corner is 16mm out-of-vertical towards the south and the south-eastern corner is 77mm out-of-vertical towards the north. It is also noted that considerable pre-existing unevenness is present in the external finishes of the perimeter walls. We believe that the out-of-vertical levels noted above are primarily pre-existing and construction related. No consistent overall tilt or offset is noted from these levels nor has any been observed from the interior damage or observations.

In conclusion, given the above difficulties taking vertical and horizontal levels, and given the fact that we have no accurate pre September 4<sup>th</sup> levels to compare against; we do not believe the surveyed level differentials give any cause for concern.

#### D. Structural Description

The Novotel Christchurch building is a 14 storey hotel building located in the north east corner of Cathedral Square in central Christchurch. The building consists of 11 stories of 4-star hotel accommodation over 3 levels of mixed retail/back of house space above an underground basement carpark. A plantroom floor is located at the uppermost storey of the building. The building was designed and detailed in 2007 in accordance with AS/NZS1170:2004 and was built between 2008 – 2009 with a formal opening in early 2010.

The gravity system for the building consists of insitu concrete composite traydec flooring (125mm to 150mm overall thickness) spanning onto composite UB secondary beams which span onto composite UC primary beams. The UC primary beams are supported by steel columns or 200/250mm thick reinforced structural precast panel elements typically to the upper levels. From level 4 to the basement the steel floor beams are supported on 250/300mm thick reinforced concrete walls containing a combination of precast and insitu concreterwork or large concrete columns to the interior areas. These large walls wrap the building for the full length of the north, east and south walls and form a podium structure to the lower 4 levels down to the basement. A large reinforced concrete gravity frame is located on the west wall from ground to level 4 with large windows set out to match with the existing Historic Warners Hotel building to the south. 125mm thick precast cladding panels wrap the upper levels of the building and are tied into the building at floor levels.

The lateral load resisting system consists of four reinforced insitu concrete walls approximately 8m long and varying in thickness from 300/400mm at the base, to 300mm in the hinge zone to 200mm at the top, located on grids 1, 7, D and G. The grid 1 wall has been designed as a coupled structural wall due to the window openings present up the height of the wall and is approximately 11m long overall. Two walls are present in each primary direction of the building.

The walls have been designed in accordance with NZS3101 using grade 300MPa longitudinal reinforcing (Grade 500MPa horizontal reinforcing) to the hinge zones and a ductility level of  $\mu=3$ , but detailed for a ductility level of  $\mu=6$ , with the ductile hinge zone occurring above level 4 to all of the main wall elements. This hinge zone location was chosen as the building footprint reduces in size from the larger podium structure between basement to level 4 into the smaller tower structure for the upper 10 levels. Closely spaced stirrups have been placed to both ends of all walls to provide confinement to the wall over the full height of the potential plastic hinge zone of approximately 8m. Carefully detailed lap locations were located outside the potential plastic





hinge zones to provide additional robustness in the hinge zones and avoid congestion of reinforcing.

A capacity design procedure has been used for the design of the wall elements above and below the hinge zone with grade 500MPa reinforcing used for both longitudinal and horizontal bars to these areas. This procedure has also been used for the floors and foundations which have been designed for the over-strength actions of the hinge zone of the walls. The level 4 floor has been specifically designed to act as a transfer diaphragm distributing the over-strength actions between walls.

The foundations consist of a 1m thick insitu concrete raft slab and two local areas of tension screw piles to the rear of the building. The gravity loads of the building are taken by the raft slab bearing directly on the gravel layer. The seismic loads from the over-strength actions from the walls are also taken by the raft slab bearing on the gravel layer. For the wall on grid G the over-strength overturning actions require the use of tension only screw piles to mobilise additional mass to hold the wall down.

The basement slab and walls have been designed to resist the expected buoyancy forces and also act as a water resistant layer with carefully placed and specified concrete and waterstops to all joints.

## **E. Investigations Carried Out**

Initial visual inspections (post February 22<sup>nd</sup>) were carried out by the undersigned and Kent Huxford of Lewis Bradford Consulting Engineers on the 26<sup>th</sup> February 2011 as part of the Civil Defence initial evaluation procedures.

Further brief visual inspections were undertaken throughout March and April 2011 but were mainly limited to access for retrieval of essential business items/files. Initial detailed inspection work was carried out through May 2011 which included the removal of local areas of linings and initial photographic works.

Following the 13<sup>th</sup> June 2011 aftershocks a further visual walkover inspection was completed which noted further damage had been sustained to the building, especially the already damaged cladding panels.

Detailed inspections were recommenced in late June 2011 and throughout July 2011, including the removal of local areas of linings and floor coverings along with photographic work and level survey work. Major structural elements were reviewed where possible to check for structural damage. Weathertightness and building services (plumbing, electrical, mechanical etc) have not been reviewed, and should be reviewed by the relevant experts.

These June and July inspections and photographs form the bulk of this report.



## F. Structural Damage and Observations

*Refer to Appendix A for floor plans which indicate photograph locations.*

*Refer to Appendix B for repair schedule for structural damage only.*

*Refer to Appendix C for detailed description of visible damage to the various areas at the various levels.*

*Refer to Appendix D for the photographs which correlate with the Appendix C notes and Appendix B repair schedule.*

*Refer to Appendix E for structural drawings detailing the major areas of repair work to the structure, which correlate with Appendices A-D.*

*Refer to the Architectural Dilapidation Report for damage to non-structural elements.*

Every effort has been made to view as much of the structural elements up the height of the building as possible. However given the presence of partitions, linings and large adjacent buildings not all areas were accessible for this review. Specific structural elements will require further detailed review as indicated in the damage register and repair schedule. Further inspection work by other specialized subcontractors/subtrades is also required.

The general nature of the structural damage is consistent with the expected behaviour of the building under the level of seismic loads imposed by the February 22<sup>nd</sup> earthquake. The primary earthquake motions were in the east-west direction and were relatively short but very powerful causing a seismic 'punch' effect on the building. This 'punch' effect has caused damage, ranging from minor to significant, to parts of the tower structure, and large areas of the claddings and linings above the level 4 hinge zone. We expect that during the brief but significant shaking the building has experienced differential horizontal deflections, between floor levels, that were at or above the original design levels of the building. However, as noted in the appendices, the damage is confined to the region above the hinge zones as this is where the majority of the building deformation was designed to occur due to the size and stiffness of the podium structure below level 4.

Generally the damage to the linings and claddings is non-structural although local areas of timber framed walls at level 13 to the eastern end were designed to act as additional bracing to the light-weight roof area and lining repairs will need to incorporate the reinstatement of the bracing elements. Photographs of lining damage have been included where necessary to assist in identifying the extent of the structural damage.

The main areas of structural damage to the upper level tower structure include local damage to the structural walls, damage to the precast concrete cladding panels, minor damage to local areas of the concrete composite floor, damage to local areas of the concrete stair landings to the northern stairs and local damage to weldplates connecting the eastern stair panels. An explanation of the extent and likely causes of damage to the above areas is described below:

### Damage to Structural Walls

In situ concrete structural walls are located on grids 1, 7, D and G and the design parameters are as described in the *Structural Description* section above. As the primary earthquake motions were largely in the east-west direction the structural walls on grids 1 and 7 have resisted the lateral loads in this direction. The grid 7 wall is more flexible than the grid 1 coupled wall and hence has incurred more damage as this wall has rotated further during the earthquake motions. The difference in stiffness between the grid 7 and grid 1 walls has caused a torsional effect on the





building which has been resisted by the couple between the grid D and grid G walls. Damage to each individual wall is described below.

The main area of damage to the grid 7 wall consists of flexural cracking at the base of the hinge zone just above level 4 in accordance with the original structural 'capacity design' philosophy. The well distributed 'fan' cracks are generally less than 0.5mm wide although one or two angled cracks are up to 0.8mm wide and appear consistent with possible flexural yielding of the structural wall. Access restrictions have prevented a thorough inspection of the exterior of the wall, however we understand that the adjacent existing building is likely to be removed or secured. Once this building is removed/secured we recommend further detailed investigation work to this wall including the removal of cover concrete across the cracks to allow detailed visual inspection and non-destructive testing of longitudinal reinforcing to both faces of the wall. We have also had initial discussions with Professor Stefano Pampanin of the University of Canterbury regarding further independent expert inspection and evaluation of the wall in the future once further detailed investigations are complete. Some other areas of repairs include local repairs of minor spalling where butt jointed cladding panels have popped the cover concrete of the wall.

The damage to the grid 1 coupled wall primarily consists of minor hairline cracking at the interface of the coupling beams and wall elements along with some hairline cracking to the wall elements at the base of the hinge zone just above level 4. The extent of the cracking to the hinge zone is very minor in comparison to the grid 7 wall with only 3-4 visible hairline cracks. Access restrictions have limited the inspection to the interior side only and once the adjacent building is demolished a thorough inspection of the exterior is required along with further detailed investigation work similar to the grid 7 wall noted above. However based on the relatively minor nature of the cracking noted to this wall we believe that the majority of the repairs will consist of careful epoxy injection of the existing hairline cracks. Some other areas of minor repairs include local repairs of minor spalling where butt jointed cladding panels have popped the cover concrete of the wall, local repairs of spalled plasterwork around the north-western stair area and one pre-existing defect where the existing wall reinforcing is exposed and requires patch repairs.

The damage to the grid D wall is generally minor and consists of local spalling and hairline cracking to the plasterwork adjacent to the grid 1 wall where the butt joint between the walls has been filled with solid drypack mortar along with some very minor hairline cracking to a local area of the north end of the wall. No significant cracking or notable damage was observed at the southern end of the wall at level 4 or any levels above. We recommend that the existing drypack mortar joint to the grid 1 wall is carefully cleaned out and a new flexible sealant is placed into this joint from level 4 up to roof level. The very minor hairline cracks at the north end of the wall can be repaired by careful injection of a suitable epoxy grout. (See attached Sika Epoxy Injection procedure, Appendix H).

The damage to the grid G wall is generally minor and consists of very fine hairline cracks over a limited extent of the base of the level 4 hinge zone. Inspection of the interior of this area of wall reveals no significant cracking or damage and the repairs to this wall will consist of careful epoxy injection of the existing hairline cracks.

#### Damage to Precast Cladding Panels to North and South Walls

These precast cladding panels are located on the north and south walls of the building between levels 3 to 12. The precast cladding panels to the north wall have suffered damage consisting of spalling of concrete cover, multiple and significant cracking and/or diagonal cracking through the vertical section of the panel elements between grids D and E with the most notable damage at levels 11, 9 and 7. The cladding panels to the south wall have suffered damage consisting of significant spalling of concrete to the corners of the panels with the most damaged areas occurring at levels 11, 10 and 5. Cladding panels to both walls have suffered horizontal out-of-plane displacement in some locations. Inspection of some of the interior areas where panel damage has occurred has revealed high strength solid mortar drypack to the interior of the panel



joints in some locations or full contact butt jointed panels with no clear movement gap. Temporary steel brackets used for the erection of the panels have remained in place in some locations and have connected the panel elements together, preventing the required interstorey seismic deformation.

Under the very high ground motions which occurred during the 22<sup>nd</sup> February earthquake (Given the actual peak ground acceleration recordings, the majority of the CBD experienced significantly larger ground motions than the actual levels this building was designed for) the building would have potentially moved approximately 50mm per floor horizontally or more. This level of interstorey movement would be expected to cause some damage to the cladding panels, due to tightening of normal construction tolerances, although the damage observed has been significantly exacerbated where panel movement has been impeded by solid high strength mortar joints between panels, butt joints or steel brackets between panels. Any initial damage has been further compounded by the high seismic loads imposed in the numerous large aftershocks that have occurred since February 2011, especially the 13<sup>th</sup> June 2011 events.

Given the widespread and significant damage sustained to the cladding panels on both the north and south elevations and the increased seismicity expected in the near future we believe that attempting to repair these panels would be very difficult and may not prevent further damage occurring in another large earthquake. We also believe that due to the widespread nature of the damage attempting to reinstate the buildings weather-proofing will also be very difficult. We recommend that the existing cladding panels are removed and a new cladding system is installed. The sequencing and temporary support required during the removal of the existing cladding system will need to be worked through with the contractor along with the details for a new cladding system. The new cladding system could be either new precast cladding panels suitably detailed to cope with the increased seismicity or a new light weight cladding system. We recommend that both options are priced by the contractor and discussed with the building owner and/or insurers. Architectural input will be necessary for waterproofing details etc.

#### Damage to Precast Panels to the West Wall

The precast cladding panels to the west wall extend from level 4 up to level 13. These panels suffered significant damage in the February earthquake due to the east-west direction of the earthquake causing high out-of-plane loads on the panels and connections along with probable higher mode effects causing notable damage to the level 10 panels. This damage was greatly exacerbated by the 13<sup>th</sup> June aftershocks which severely damaged the already weakened panels and exacerbated the deformation of the connections.

Due to the severity and extent of the damage to these panels we believe that these panels need to be removed full height and replaced with a new cladding system. The new cladding system could be either new precast cladding panels suitably detailed to cope with the increased seismicity or a new light weight cladding system. We recommend that both options are priced by the contractor and discussed with the building owner and/or insurers.

#### Damage to Local Areas of Composite Floor

The traydec composite floor varies in thickness up the building from 150mm thick between ground and third floors, to 125mm thick for the upper levels. A 170mm thick insitu concrete floor exists at level 4 to act as a transfer diaphragm.

The floor has been inspected adjacent to the primary structural walls up the building and no significant structural damage has been noted, although some very minor hairline cracking has been observed and some minor repairs are required. Hence we believe that the diaphragm connections to the primary structural walls are essentially undamaged and have retained their structural integrity.





However damage has occurred to local areas of the floor around the perimeter of the building where localised spalling of concrete was observed. The primary cause for the spalling of the concrete is the deformation compatibility of the perimeter cladding panels under high seismic loads. As the building has moved laterally the precast cladding panels, in some locations, have rotated between floors which has caused the floor topping at either one or both ends to crack locally and/or spall the concrete topping. This has been exacerbated where the movement of the cladding panels has been impeded as noted in the *Damage to Precast Cladding Panels to North and South Walls* section above. Repairs to these areas of floor consist of carefully removing the existing floor coverings, breaking out and removing all damaged concrete and carefully casting new topping concrete into place. These repairs need to be carried out in conjunction with the reinstatement works to the adjacent cladding panels.

#### Damage to Northern Stairs

The northern stairs consist of precast concrete stair flights (either 150mm or 175mm throat thickness) spanning onto insitu concrete landings at floor level or at mid-height between floors. The insitu landings span north-south and are supported on the grid 1 structural wall or structural steelwork. Each precast stair flight has been cast into the upper landing level whilst the base of the stair flight is supported on the top of the lower landing but is free to move horizontally. The insitu mid-height landings are connected to the adjacent structural walls along both the grid 1 and grid D edges.

The damage to these stair landings consists of moderate spalling of concrete to the mid-height landings adjacent to the joint between the main structural walls at grid D1, minor plasterwork damage and/or minor hairline cracking to the grid 1 and grid D structural walls. The damage to the grid D and grid 1 structural walls is covered in the *Damage to Structural Walls* section above. The damage to the stair landings has been caused by the high seismic loads acting in the east-west direction causing the building to deflect and rotate about the stiffer grid 1 coupled wall and when the grid D wall deflects to maintain equilibrium the landings have been forced to deform and crack to accommodate the movements required. Some hairline cracking near the cantilever edge of the landings is noted and we believe that in most cases these are existing shrinkage cracks that have opened up with the horizontal movement of the stair flights under seismic loads. Repairs to the landings will consist of carefully breaking out all damaged concrete and reinstating with new insitu concrete, building a seismic joint between the mid-height landings and the grid D wall to reduce damage in future events and carefully epoxy injecting the existing hairline cracks to the cantilever areas of the landings.

#### Damage to Eastern Stair Panels

The eastern wall of the eastern stairs consists of 150mm thick precast panels which act as a cladding panel but also support the gravity load of the stairs or the adjacent area of floor. These 150mm thick panels are tied into the building at each floor level by composite steel floor beams or by the insitu concrete landings at mid-height. The panels are also connected together just below each floor level by a structural steel weldplate connection.

Due to the aforementioned torsional effect on the building the grid G structural wall has had to deform to maintain equilibrium of the structure under the east-west seismic loads imposed by the February earthquake. As this wall has deformed the adjacent 150mm thick precast panels along grid G have also moved to maintain deformation compatibility. This movement on the relatively rigid weldplate connections has caused damage to the concretework around the weldplates, most notably near the top of the building, which requires repair work. It was also observed that solid drypack mortar has been installed in a number of joints to these panels. Note that as these weldplates were primarily designed to provide additional support to the precast panels during erection and installation and the 150mm precast panels are only required to support gravity loads and not in-plane seismic loads these connections are not deemed a critical seismic connection.



To repair the damage to the weldplates we recommend that the existing concrete around one weldplate connection is carefully broken out to allow a detailed visual inspection of the weldplate along with some non-destructive testing to confirm the existing welds and cast-in elements are undamaged. Following the satisfactory completion of this investigation work we recommend that existing damaged weldplates are carefully cleaned to remove damaged plasterwork/paintwork, all drypack mortar is removed from the panel joints and the weldplates grouted up with high-strength cementitious grout to reinstate the panel connections.

## **G. Repair Recommendations**

Based on the detailed inspections some necessary structural repairs have been identified. Where various structural repair options are suggested, the options are based upon 'like for like' repair, unless noted otherwise.

The repair schedule is detailed in Appendix B and includes recommendations for repairs to concrete walls, concrete flooring and structural steelwork elements. It is assumed that the superficial elements such as plasterboard linings, timber framed elements, paintwork and the like are repaired, restopped and repainted as per the architect's recommendations.

We also recommend that all services for the building are thoroughly checked and approved by the original services contractors and consultants. This includes, but is not limited to; the lifts, electrical and hydraulic services.

## **H. Structural Performance of Building**

Given the number of significant, and varied, main seismic events and aftershocks since September 4<sup>th</sup> 2010, especially the February 22<sup>nd</sup> 2011 event; this building has performed very well structurally.

The exception to this is the damage to the essentially non-structural cladding panels given the very high shaking and resulting interstorey deflections experienced on February 22<sup>nd</sup>. Some, if not all of these window panels will require replacing.

In addition all primary shearwalls have exhibited some flexural cracking primarily to the detailed hinge regions. Generally this cracking is minor, except to the southern grid 7 wall where more substantial flexural cracking has occurred but to a very localised and defined region of the hinge between levels 4 and 5. Due to good original detailing lifting the base of this hinge above floor level, it does not appear that the flexural cracking has impacted significantly on the adjoining floor diaphragms.

Further testing of this particular hinge is required during repairs to thoroughly check the degree of flexural deformation and ensure undue yielding of this walls reinforcing has not occurred.

We will be obtaining specialist peer input from Professor Stefano Pampanin for this critical element.

Assuming that yielding of the hinge(s) has not occurred we intend to repair these structural elements back to the condition they were in on September 3<sup>rd</sup> 2010. There does not appear to be any major causes for concern, or to question the buildings functionality in the long term.

As previously mentioned, there does not appear to be any evidence of liquefaction on or in the immediate vicinity of the site, and the founding of the building has not been compromised.





Finally, the question will be raised as to how the building now compares to our current building codes, especially seismic code levels.

This building was seismically designed in 2007 to fully comply with AS/NZS 1170:2004 i.e. it was designed to 100% NBS (new building standard) against our codes still current at February 22<sup>nd</sup> 2011.

Following the events on and after February 22<sup>nd</sup> it is accepted that geologically we are in a period of heightened seismicity which could continue for many years to come.

Due to this and the 'awakening' of the previously hidden faults close to the Christchurch area; the hazard factor 'Z' for Christchurch used to derive our seismic loads has been increased by 36% from  $Z=0.22$  to  $Z=0.30$ . This is officially effective from 19<sup>th</sup> May 2011.

Therefore in simplistic terms, the Novotel Hotel provides for 73% of NBS (new building standard) subsequent to 19<sup>th</sup> May 2011 (i.e.  $0.22/0.3$ ).

However given the detailing utilised, and the capacity design approach followed for the original design, we firmly believe that from a strength point of view this building is capable of withstanding the full current new seismic loads. This is due to the building originally being designed for  $\mu=3$  loads but detailed with  $\mu=6$  detailing provisions. Therefore there is the 'scope' within this original design and given the robustness of the detailing (of walls, floor diaphragms, and foundations) to accommodate higher seismic loads once the building is repaired to its pre earthquake condition.

From a serviceability point of view though, such an extreme event as our 'new code' seismic event will still cause significant interstorey deflections and damage to non structural elements such as wall linings, claddings etc.

## I. Conclusion

The February 22<sup>nd</sup> 2011 earthquake was a particularly devastating event for the Christchurch CBD. Recorded levels of shaking, in certain locations, were considerably higher than the code design levels at that time and current guidance indicates a period of heightened seismicity for Christchurch for several years. Numerous buildings within the CBD suffered severe damage and approximately 900 buildings may require demolition. Further to the initial earthquake the large number and magnitude of aftershocks, including some particularly large ones on 13<sup>th</sup> June 2011, have caused further damage to large areas of Christchurch including the CBD.

As a result of the earthquakes the Novotel Cathedral Square has suffered some structural damage which is generally consistent with the expected behaviour and design philosophy of the building under the very high levels of seismic loads experienced. A thorough inspection and initial investigation process has been completed in the preparation of this report which we believe has covered the nature of the structural damage to the building. This structural damage ranges from very minor to significant damage and detailed photographic work in the appendices outlines the extent. All the main areas of significant structural damage have been documented, the causes of the damage explained and suggested repair works and recommendations provided.

We believe that the primary lateral load resisting structure of the building has performed very well in the recent seismic events and following some further detailed inspection and repair work, specifically to the grid 7 wall, can be reinstated to the same structural condition as before the earthquakes. Repair work is required to the damaged stair areas generally consisting of breaking out damaged areas of concrete and reinstating with new concrete, along with tolerance for greater seismic movement between the grid 1 and D walls in the future.



However due to the widespread and severe damage to the precast cladding panels around the perimeter of the building along with the increased seismicity expected in the near future and the difficulties associated with reinstating the weatherproofing of the cladding we recommend that these cladding panels are removed and replaced with a new cladding system. The new cladding system can be either similar weight concrete panels suitably detailed for the new seismic design loads and interstorey displacements or a new light weight cladding with suitable seismic details. Sequencing and temporary support of the floor edge will need to be worked through with the contractor for pricing purposes. We recommend that the contractor prices both options for discussion with the building owners and insurers.

Once the detailed investigations, repairs and reinstatement works are thoroughly and competently completed we believe the building will be returned to a similar structural integrity as originally designed.

#### Limitation

It is important to note that this report is based on a detailed inspection that covered the accessible areas of the building only. It is possible that there are unobserved issues that may require further remedial work during the repair process, such issues should be brought to the attention of the undersigned as soon as possible.

Should you require anything further please contact the undersigned.

Yours sincerely,



Ashley Wilson  
ASSOCIATE  
110170 - Structural Damage Report - August 2011

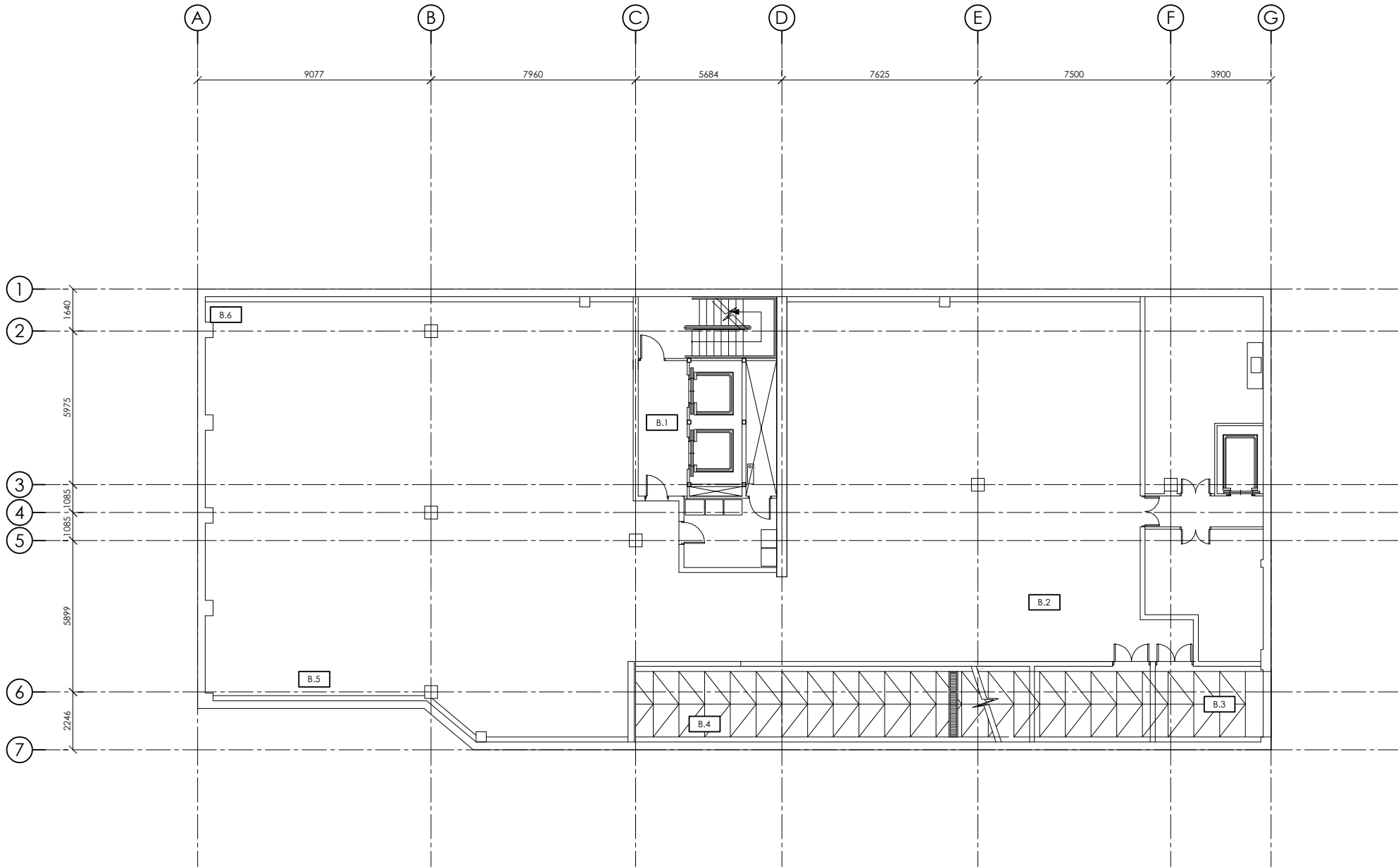


# APPENDIX A

## Floor Plans/Elevations and Photograph Layout







**BASEMENT FLOOR PLAN**  
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1	23/08/11	REPORT ISSUE	GPW
REV.	DATE	AMENDMENT	BY

ARCHITECT:

**lewis bradford**  
CONSULTING ENGINEERS

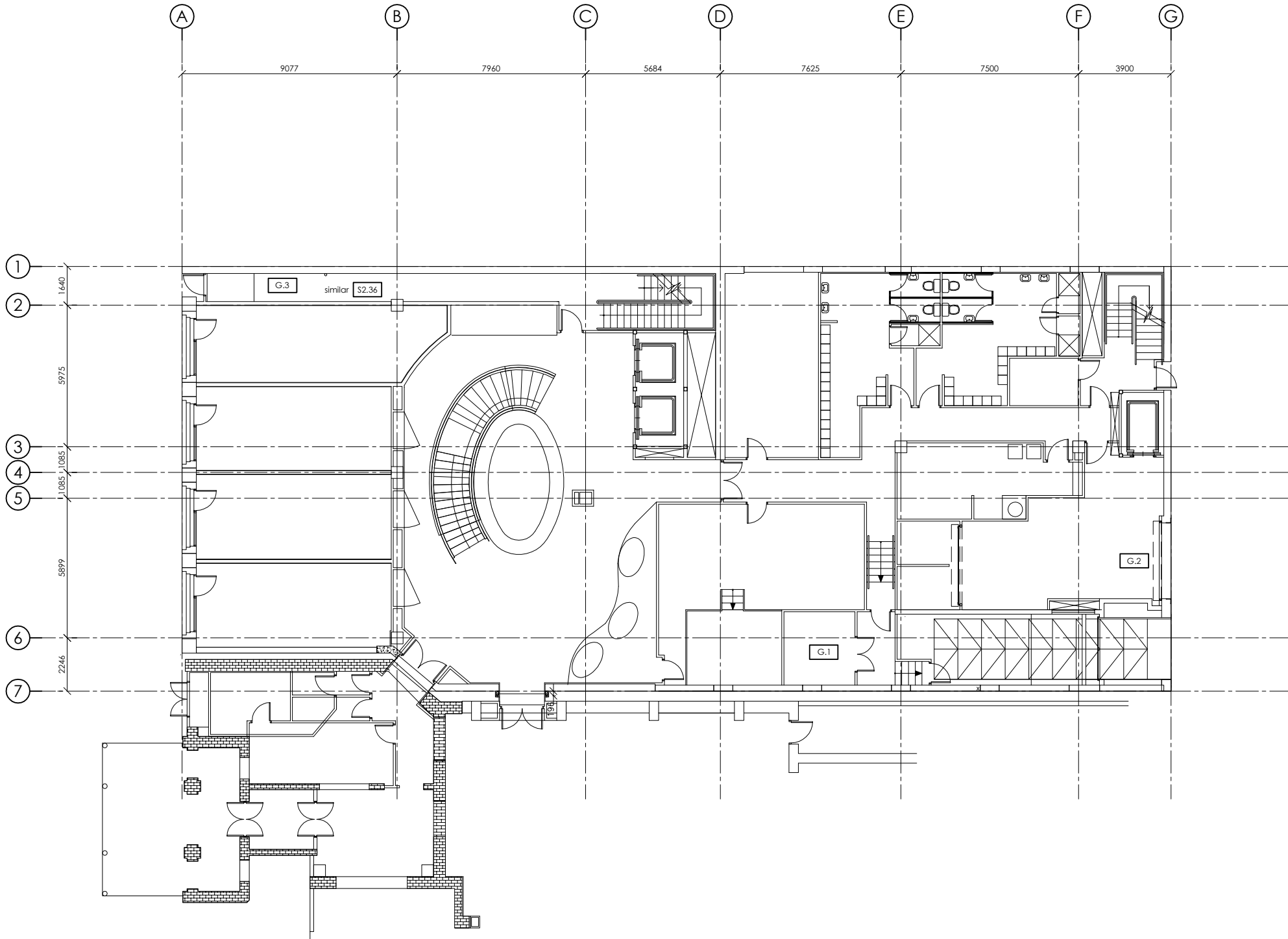
PROJECT:

**NOVOTEL  
CATHEDRAL SQUARE**

DRAWING TITLE:

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PHOTO REFERENCES**

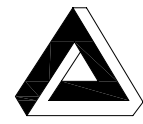
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FILE: 110170	DRAWING NO. P1-1	REV. 1



GROUND FLOOR PLAN  
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1	23/08/11	REPORT ISSUE	GPW
REV.	DATE	AMENDMENT	BY

ARCHITECT:



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CONSULTING ENGINEERS

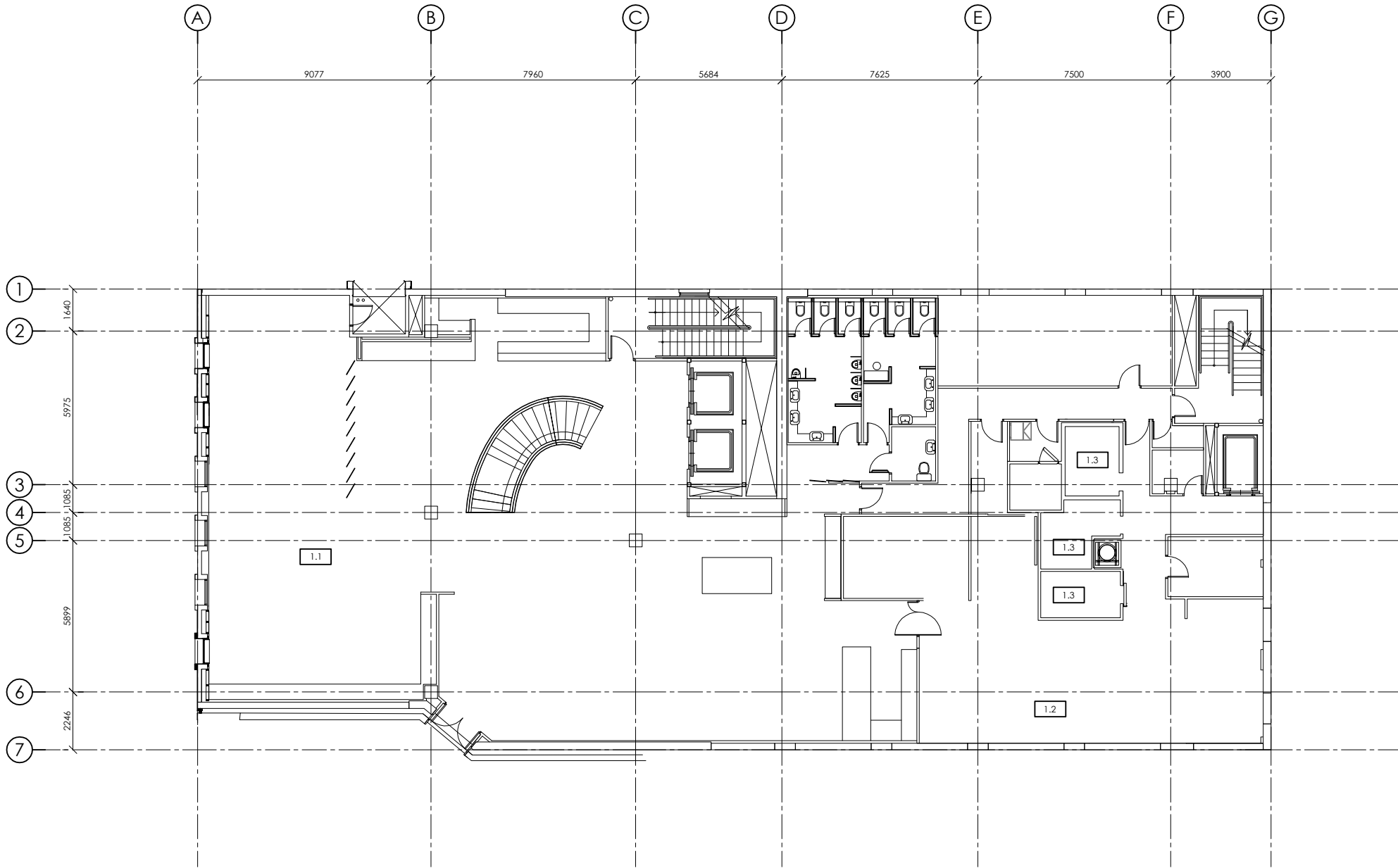
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CATHEDRAL SQUARE

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GROUND FLOOR PLAN  
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FILE: 110170	DRAWING NO. P2-1	REV. 1




LEVEL 1 FLOOR PLAN  
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REV.	DATE	AMENDMENT	BY
1	23/08/11	REPORT ISSUE	GPW

ARCHITECT:



  
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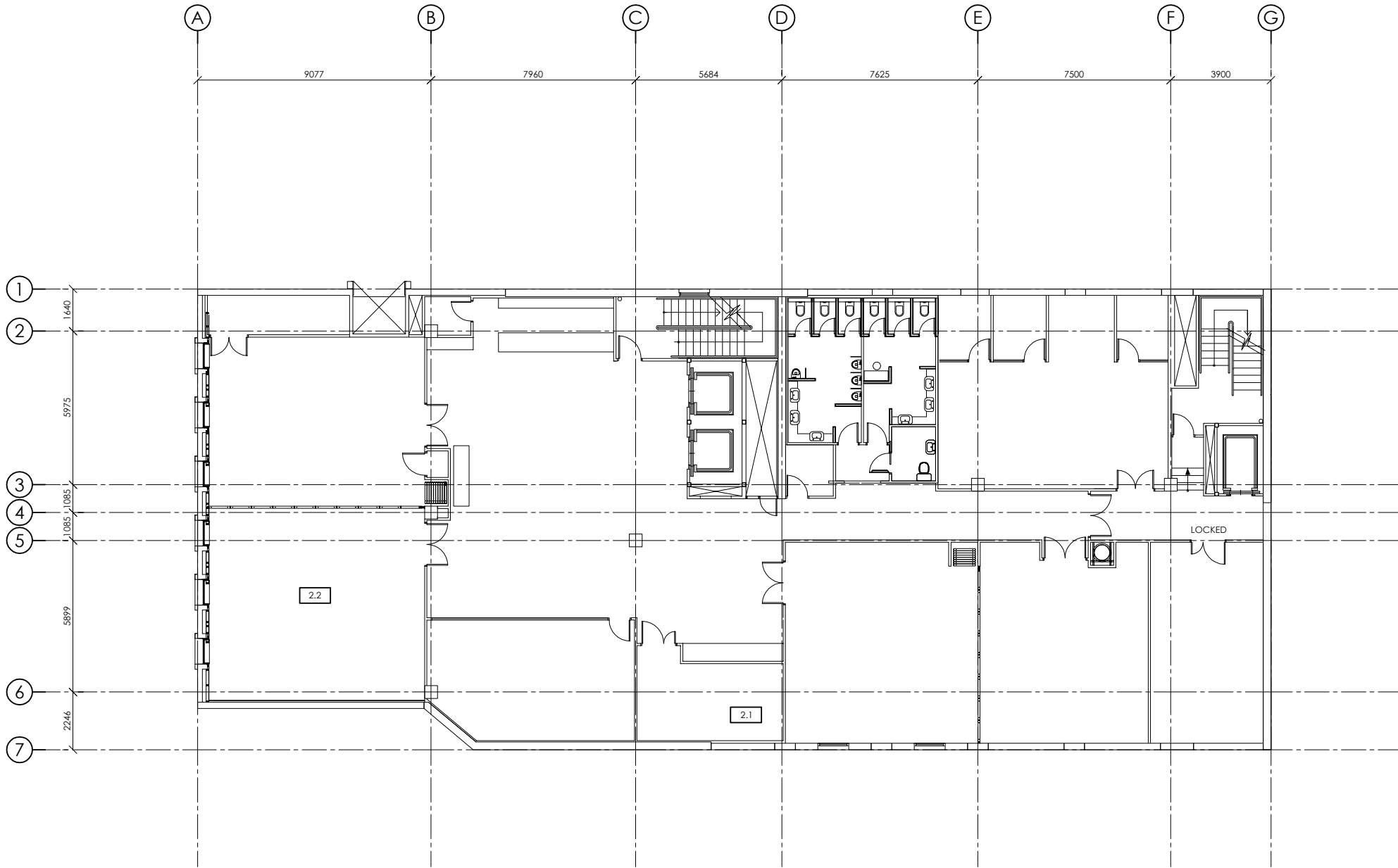
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NOVOTEL  
CATHEDRAL SQUARE

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FILE: 110170	DRAWING NO. P3-1 REV. 1



LEVEL 2 FLOOR PLAN  
1:100

1	23/08/11	REPORT ISSUE	GPW
REV.	DATE	AMENDMENT	BY

ARCHITECT:



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PROJECT:

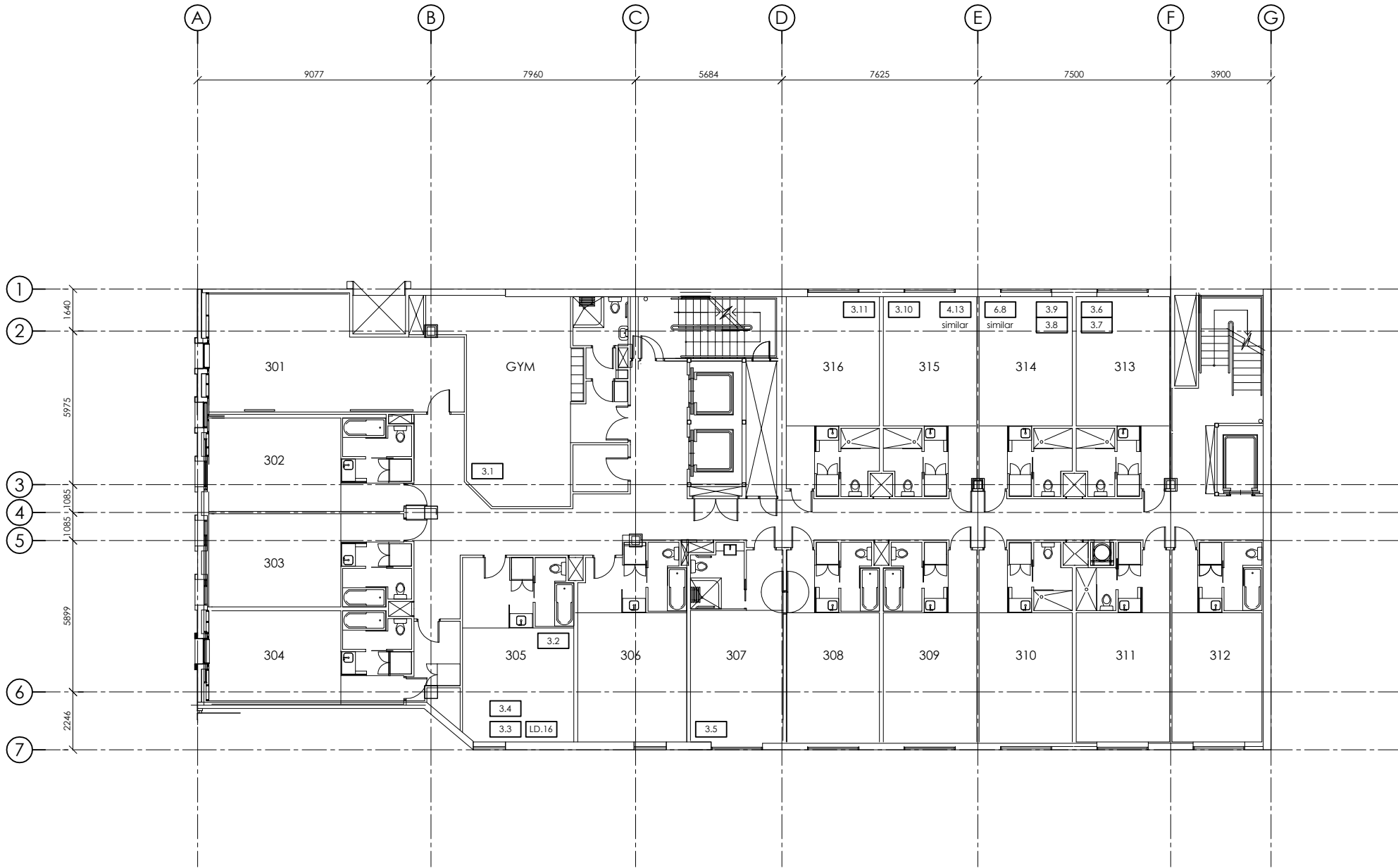
NOVOTEL  
CATHEDRAL SQUARE

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LEVEL 3 FLOOR PLAN  
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REV.	DATE	AMENDMENT	BY

ARCHITECT:



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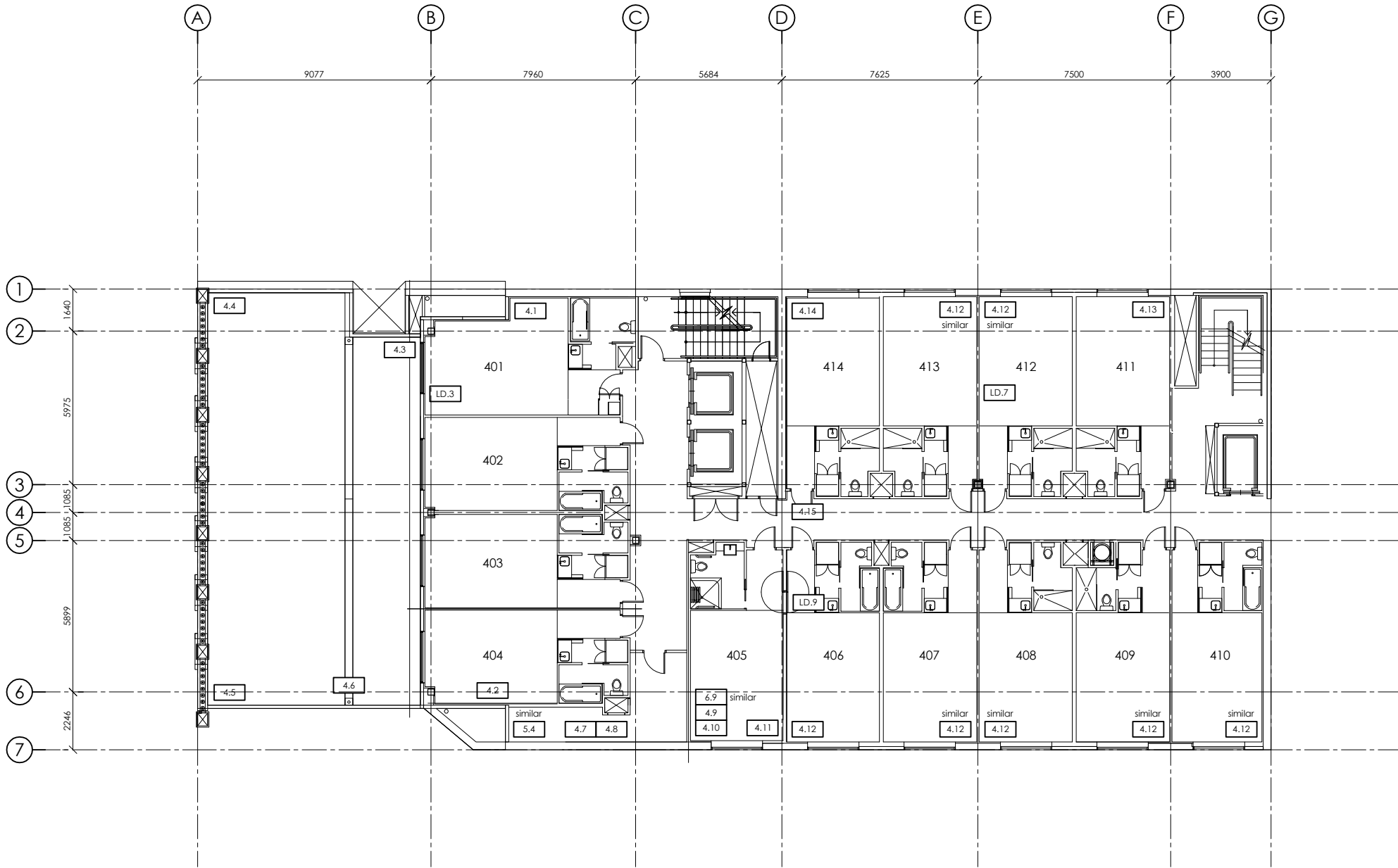
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NOVOTEL  
CATHEDRAL SQUARE

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LEVEL 4 FLOOR PLAN  
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REV.	DATE	AMENDMENT	BY

ARCHITECT:

lewis bradford  
CONSULTING ENGINEERS

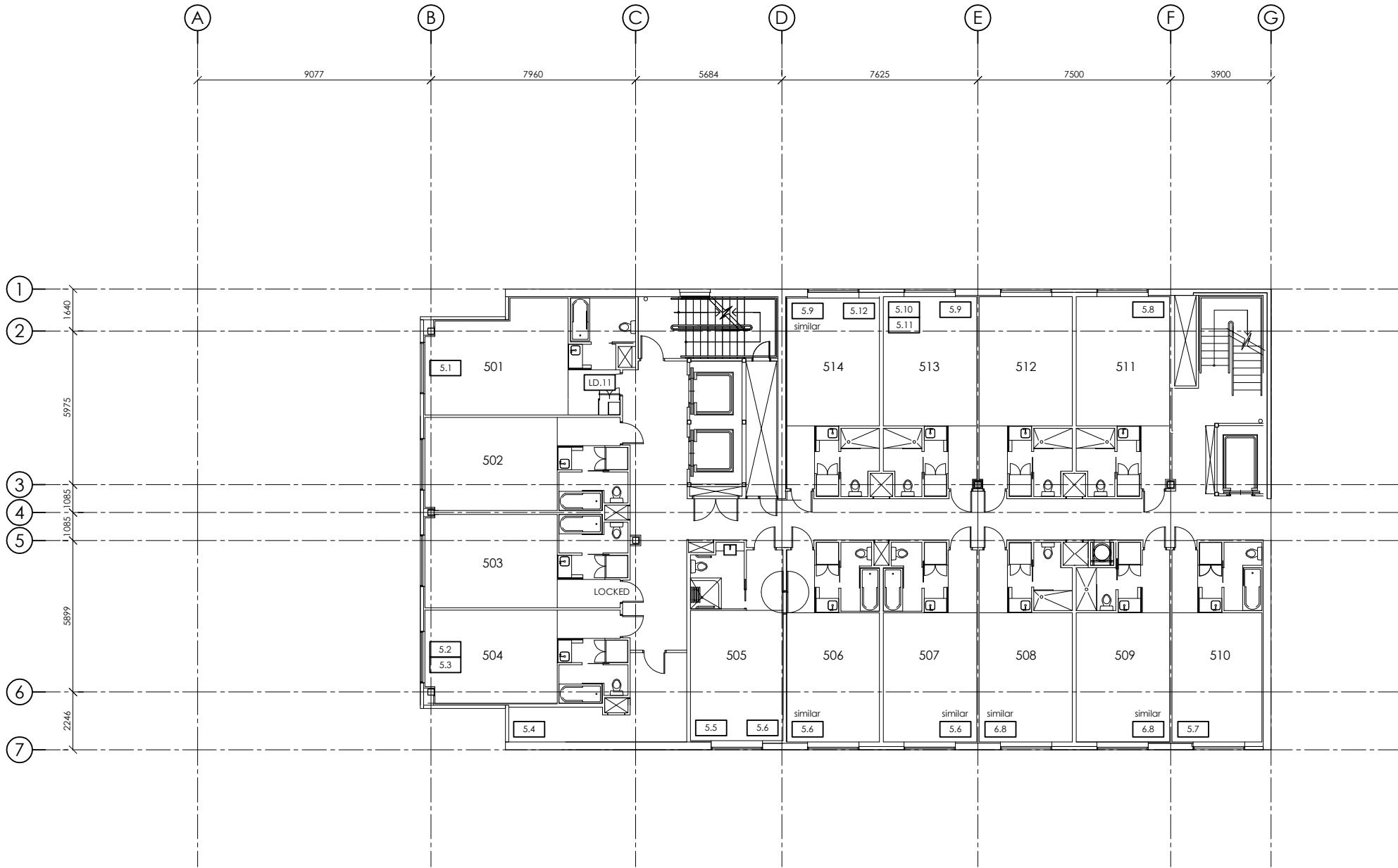
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NOVOTEL  
CATHEDRAL SQUARE

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LEVEL 5 FLOOR PLAN  
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REV.	DATE	AMENDMENT	BY

ARCHITECT:

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CONSULTING ENGINEERS

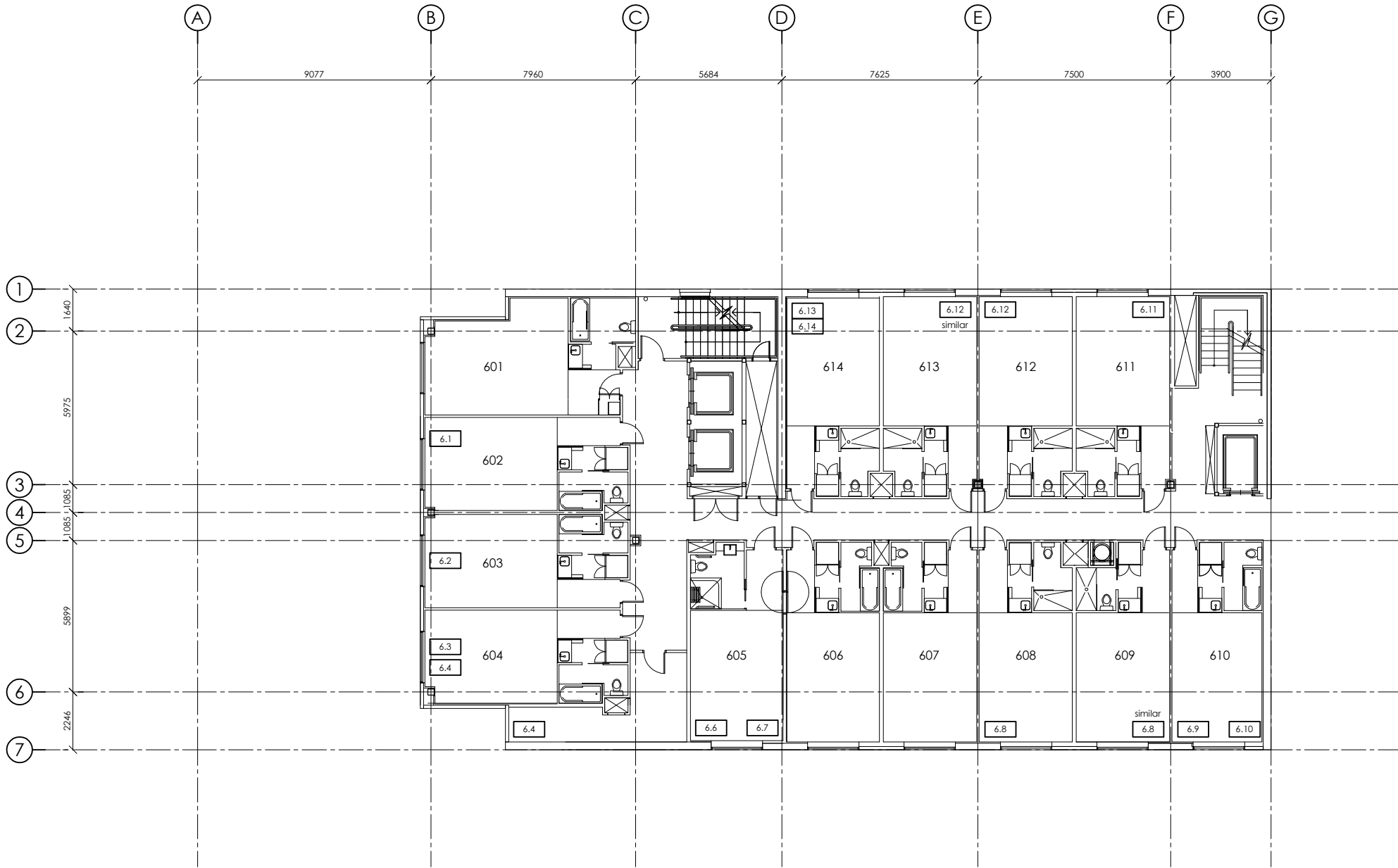
PROJECT:

NOVOTEL  
CATHEDRAL SQUARE

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LEVEL 6 FLOOR PLAN  
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1	23/08/11	REPORT ISSUE	GPW
REV.	DATE	AMENDMENT	BY

ARCHITECT:

lewis bradford  
CONSULTING ENGINEERS

PROJECT:

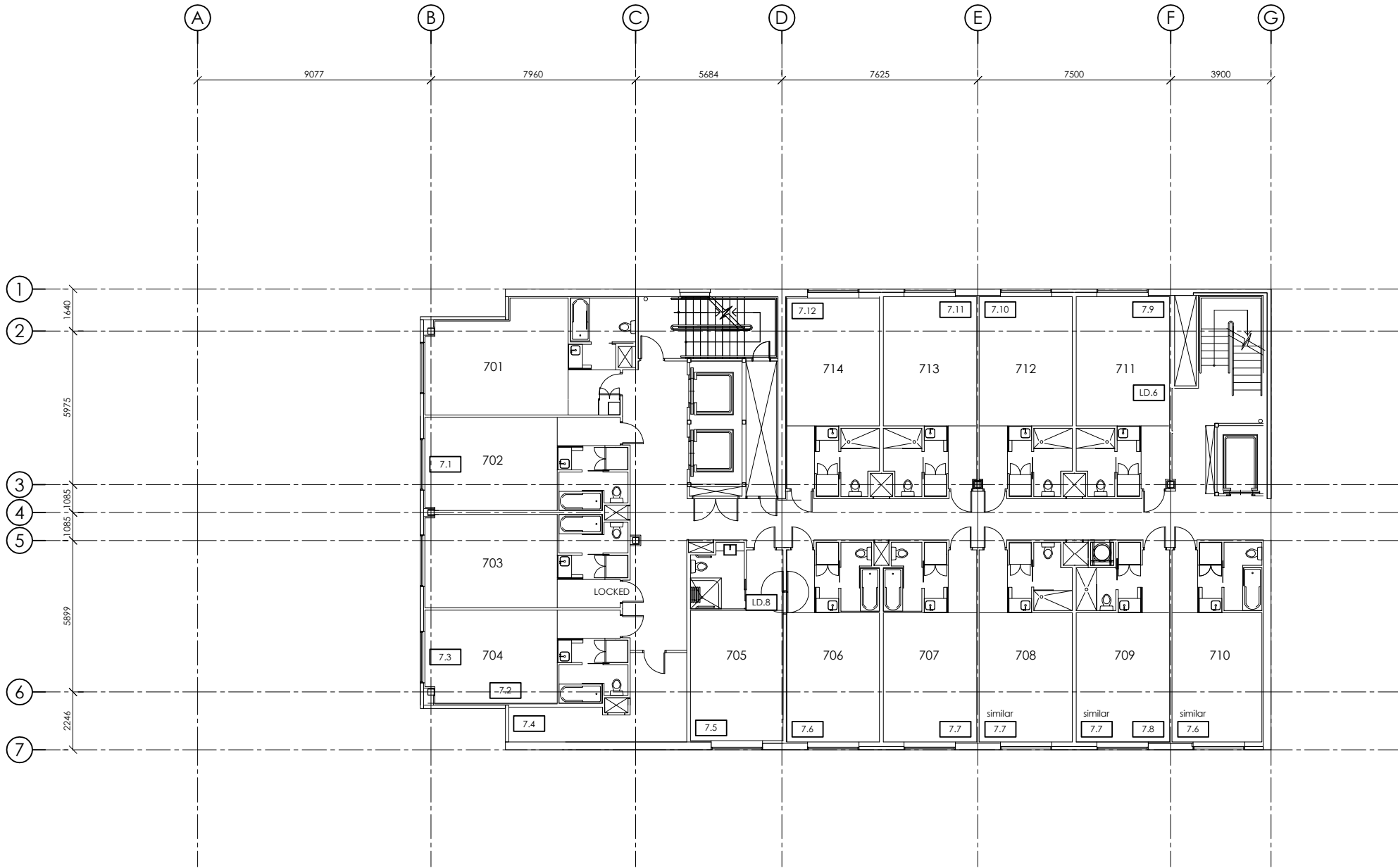
NOVOTEL  
CATHEDRAL SQUARE

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LEVEL 6 FLOOR PLAN  
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FILE: 110170	DRAWING NO. P8-1	REV. 1





LEVEL 7 FLOOR PLAN  
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REV.	DATE	AMENDMENT	BY

ARCHITECT:

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CONSULTING ENGINEERS

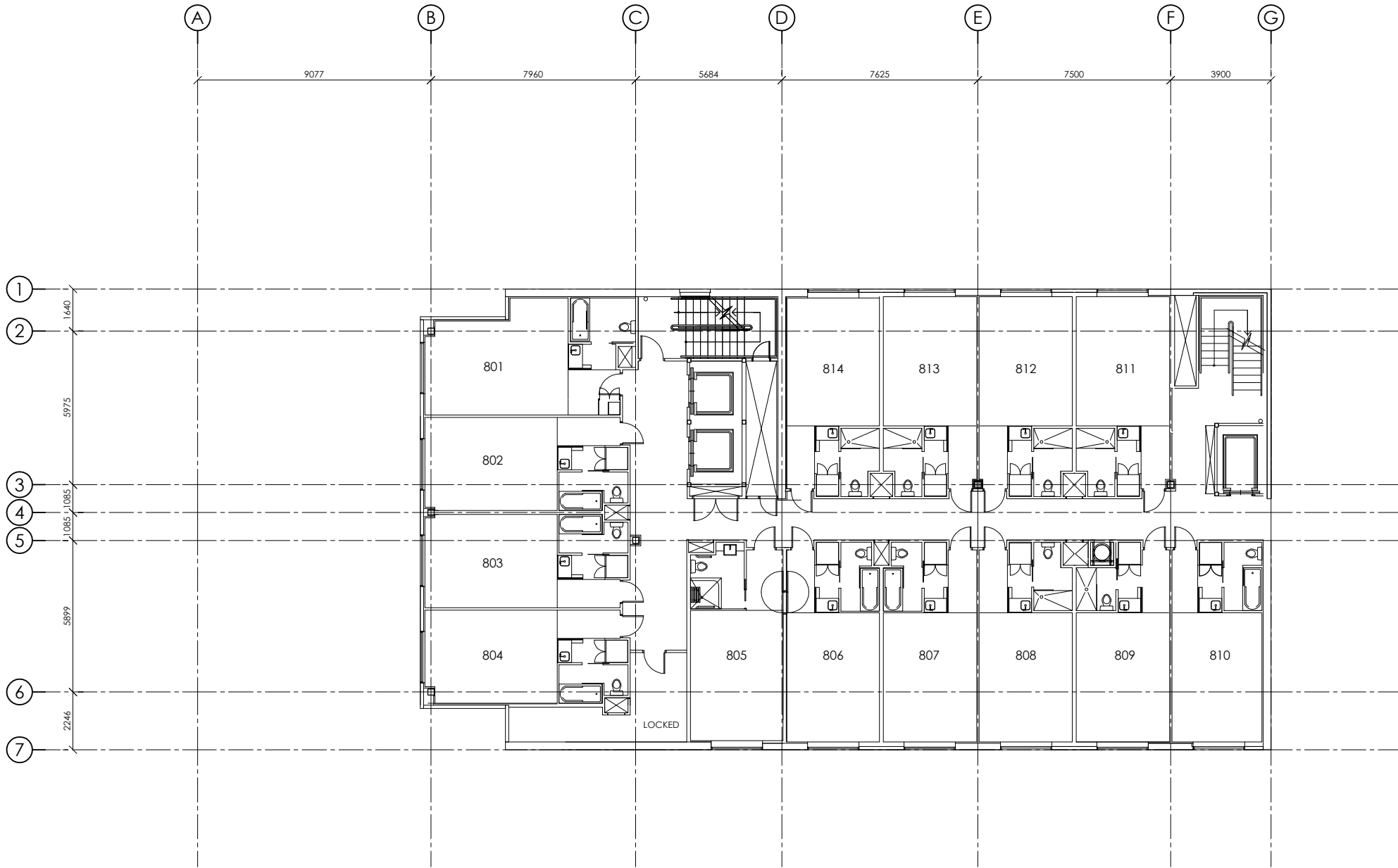
PROJECT:

NOVOTEL  
CATHEDRAL SQUARE

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LEVEL 7 FLOOR PLAN  
PHOTO REFERENCES

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FILE: 110170	DRAWING NO. P9-1	REV. 1



OBSERVED DAMAGE VERY SIMILAR TO LEVEL 9  
REFER TO LEVEL 9 FOR TYPICAL PHOTOS AND SUGGESTED REPAIRS

LEVEL 8 FLOOR PLAN  
1:100

REV.	DATE	AMENDMENT	BY
1	23/08/11	REPORT ISSUE	GPW

ARCHITECT:

lewis bradford  
CONSULTING ENGINEERS

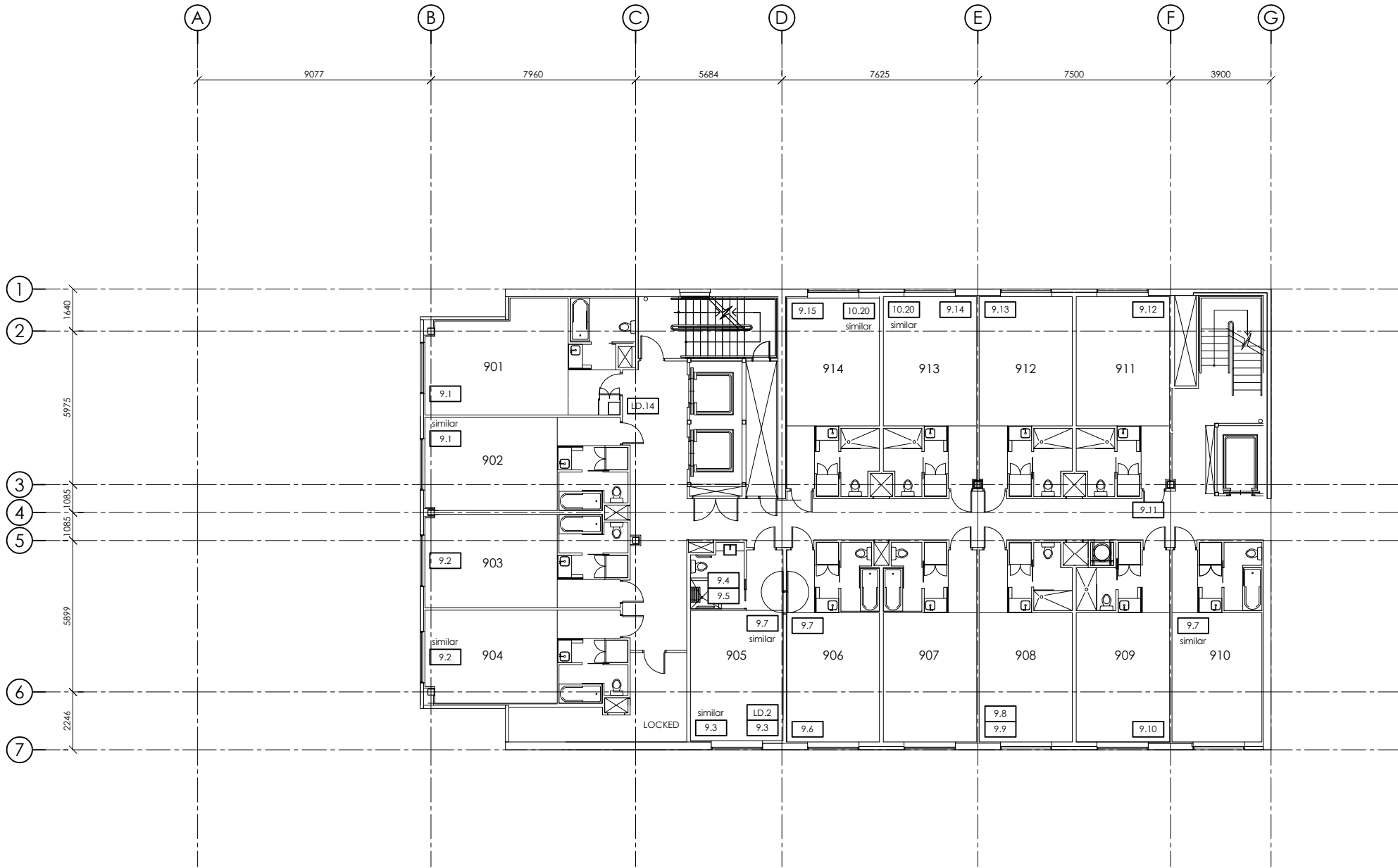
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NOVOTEL  
CATHEDRAL SQUARE

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LEVEL 8 FLOOR PLAN  
PHOTO REFERENCES

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LEVEL 9 FLOOR PLAN  
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REV.	DATE	AMENDMENT	BY

ARCHITECT:

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CONSULTING ENGINEERS

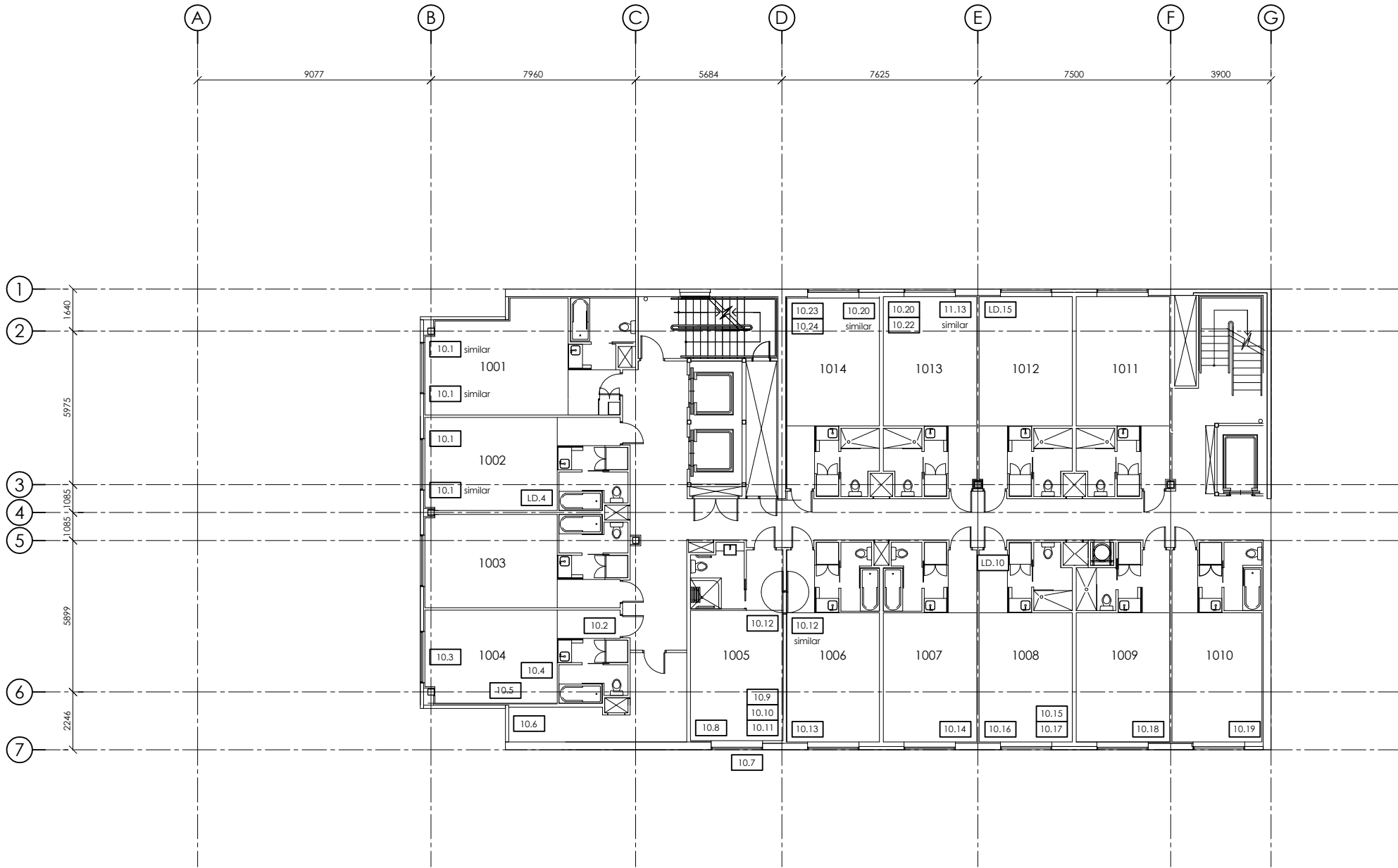
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NOVOTEL  
CATHEDRAL SQUARE

DRAWING TITLE:

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LEVEL 10 FLOOR PLAN  
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REV.	DATE	AMENDMENT	BY

ARCHITECT:

lewis bradford  
CONSULTING ENGINEERS

PROJECT:

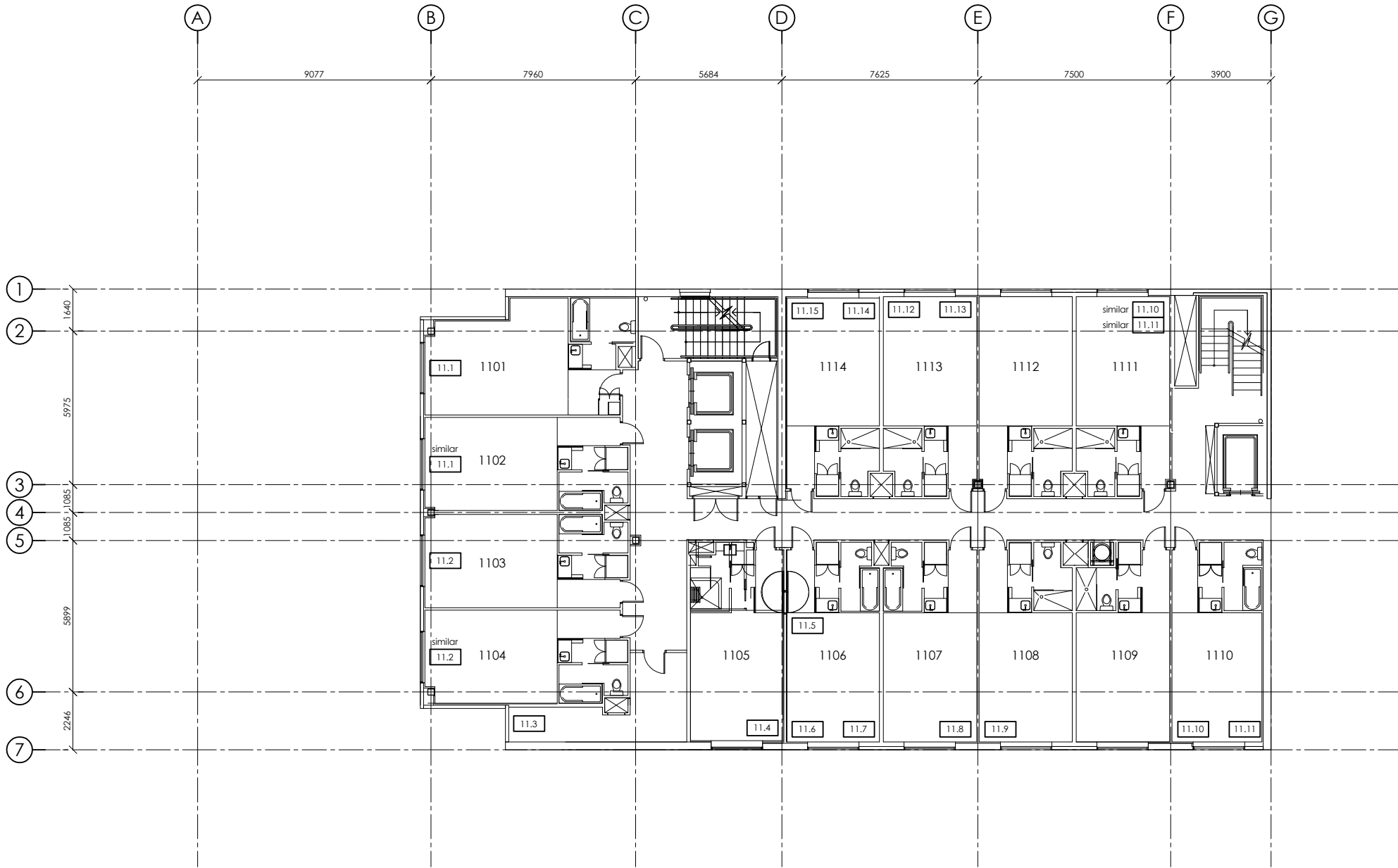
NOVOTEL  
CATHEDRAL SQUARE

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LEVEL 10 FLOOR PLAN  
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LEVEL 11 FLOOR PLAN  
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REV.	DATE	AMENDMENT	BY

ARCHITECT:

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CONSULTING ENGINEERS

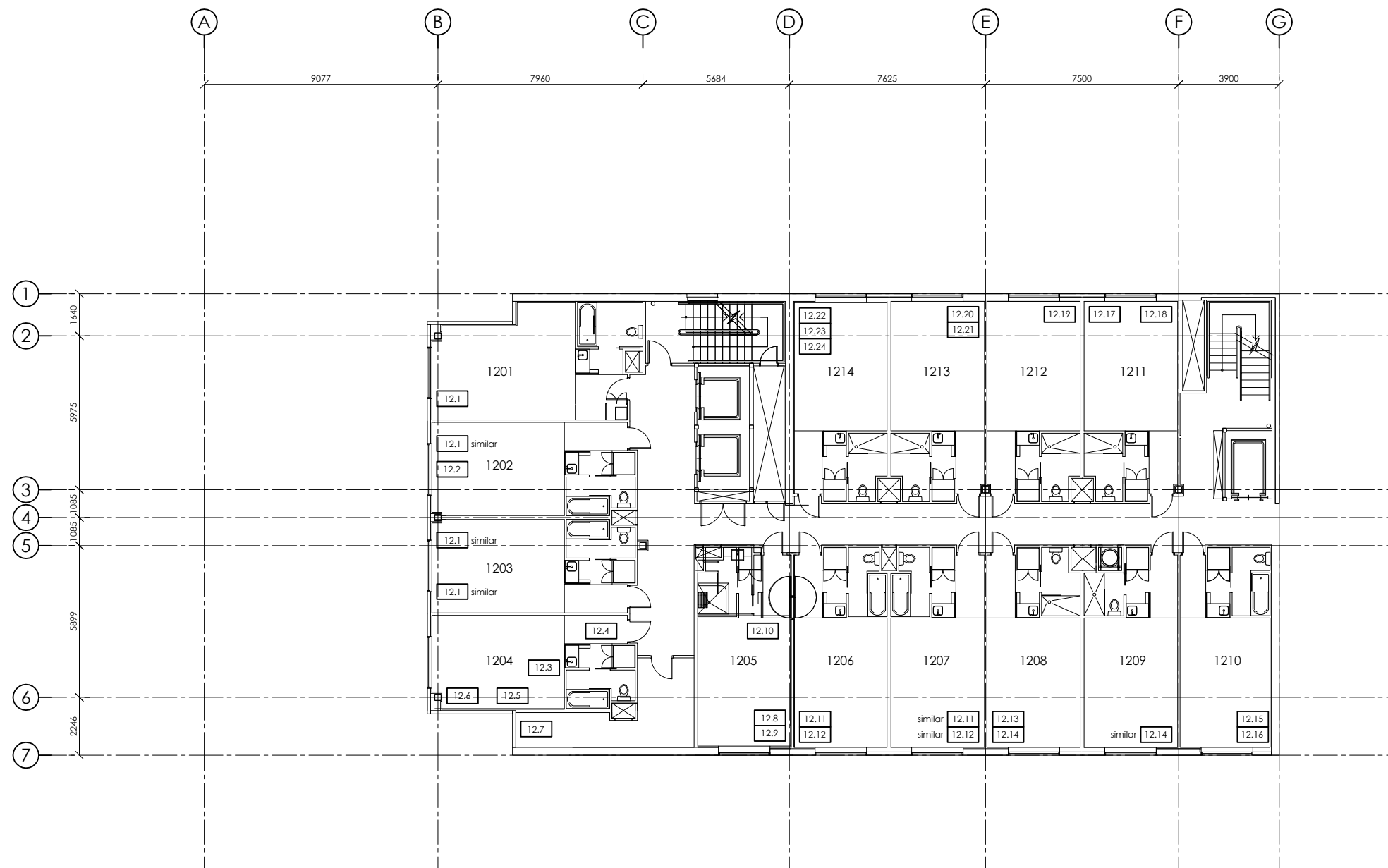
PROJECT:

NOVOTEL  
CATHEDRAL SQUARE

DRAWING TITLE:

LEVEL 11 FLOOR PLAN  
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LEVEL 12 FLOOR PLAN  
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ARCHITECT:



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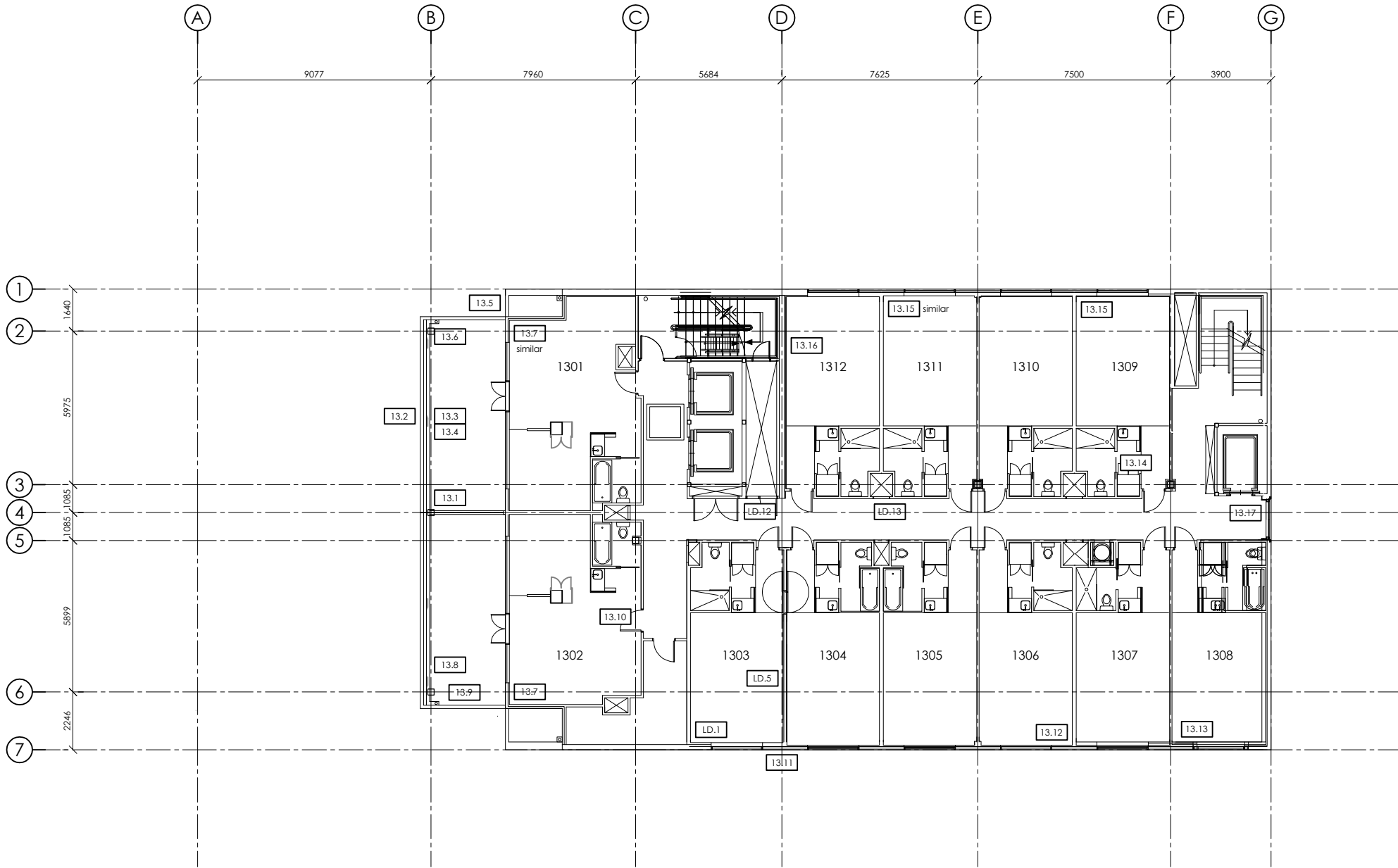
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NOVOTEL  
CATHEDRAL SQUARE

DRAWING TITLE:

LEVEL 12 FLOOR PLAN  
PHOTO REFERENCES

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LEVEL 13 FLOOR PLAN  
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REV.	DATE	AMENDMENT	BY

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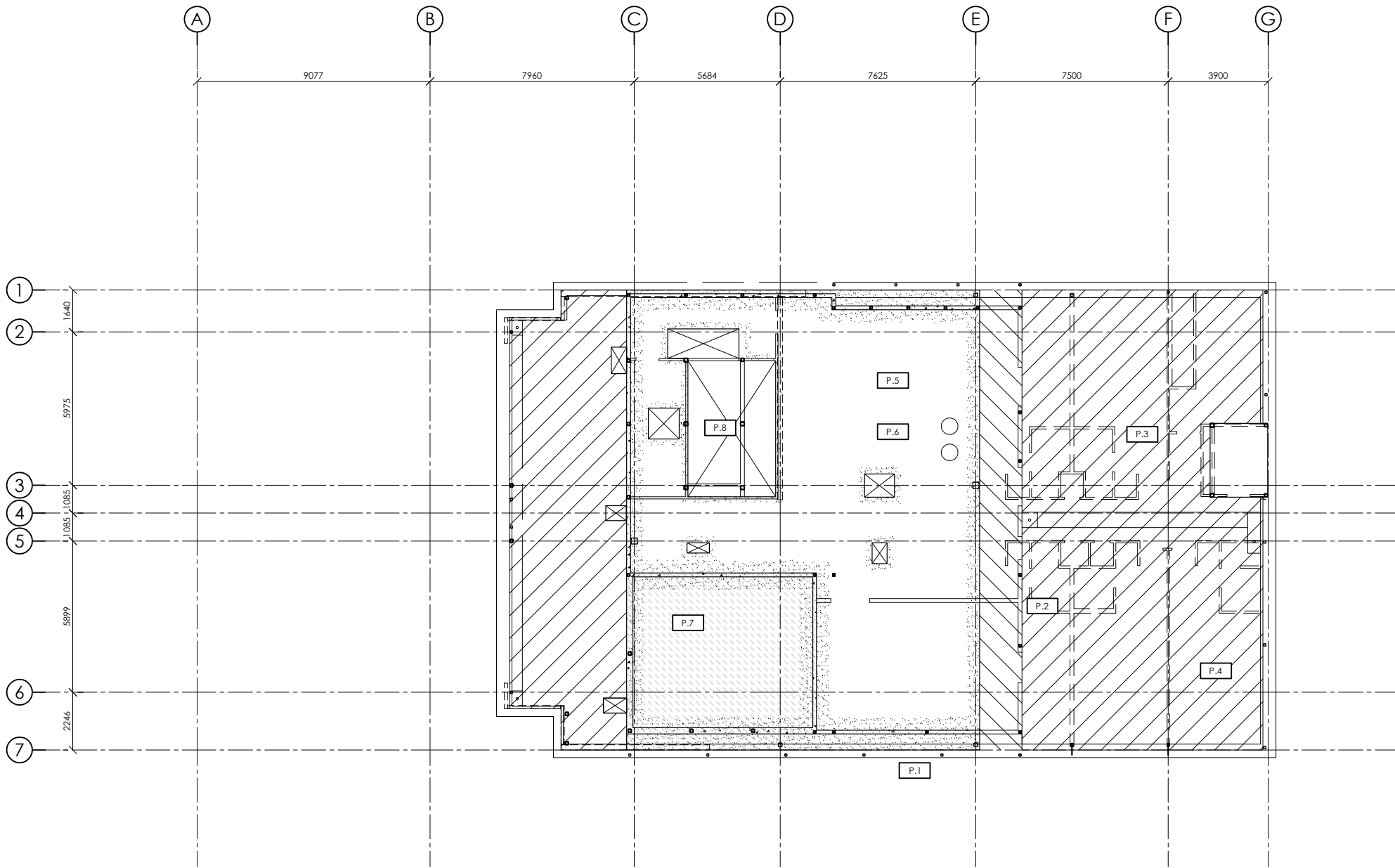
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NOVOTEL  
CATHEDRAL SQUARE

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LEVEL 13 FLOOR PLAN  
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PLANT ROOM FLOOR PLAN  
1:100

1	23/08/11	REPORT ISSUE	GPW
REV.	DATE	AMENDMENT	BY

ARCHITECT:

lewis bradford  
CONSULTING ENGINEERS

PROJECT:

NOVOTEL  
CATHEDRAL SQUARE

DRAWING TITLE:

PLANT ROOM FLOOR PLAN  
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CONTRACTOR TO VERIFY ALL DIMENSIONS ON SITE  
REFER TO ARCHITECT'S DRAWING FOR ALL SETOUTS

1	23/08/11	REPORT ISSUE	GPW
REV.	DATE	AMENDMENT	BY

ARCHITECT:



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PROJECT:

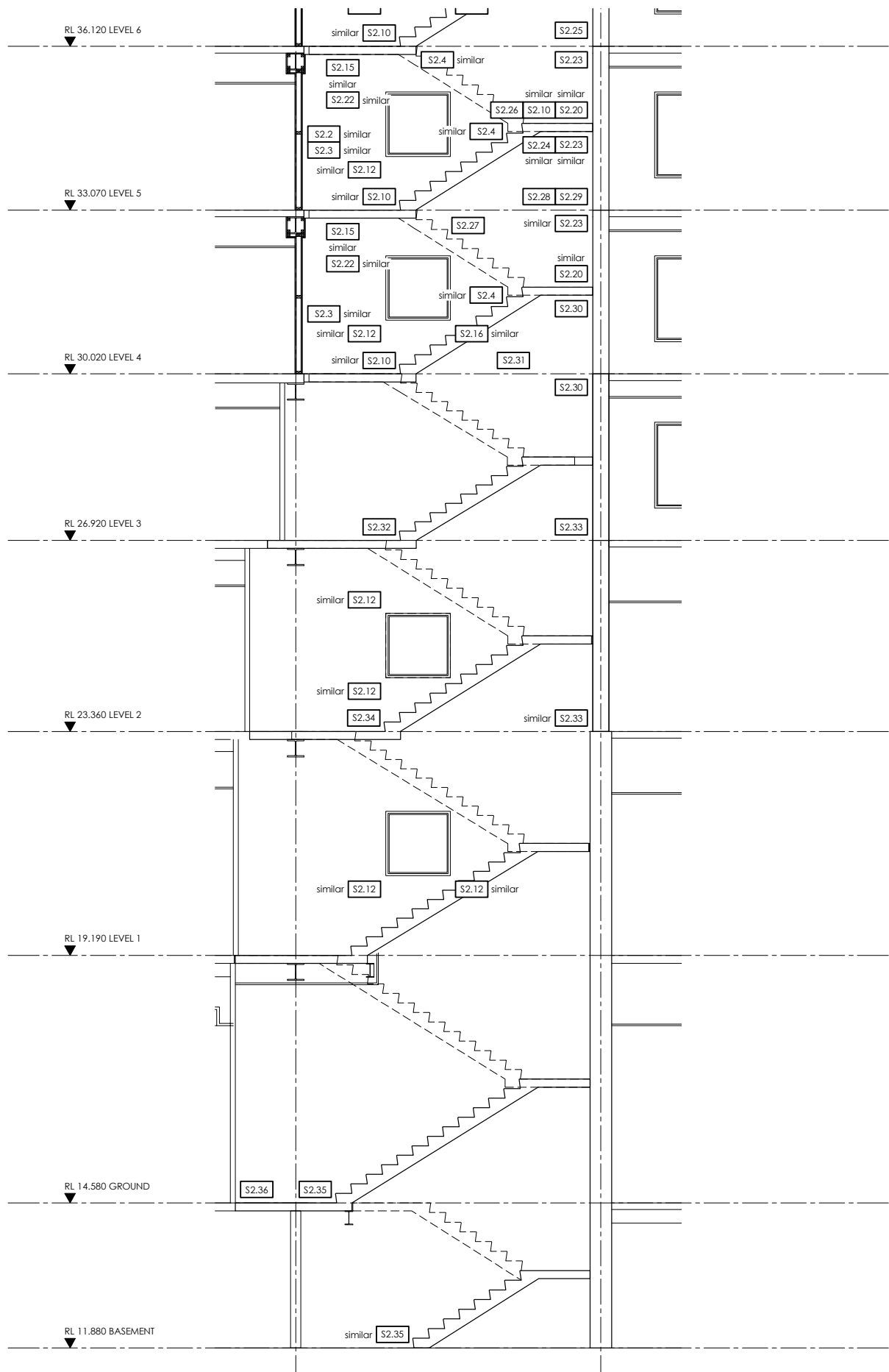
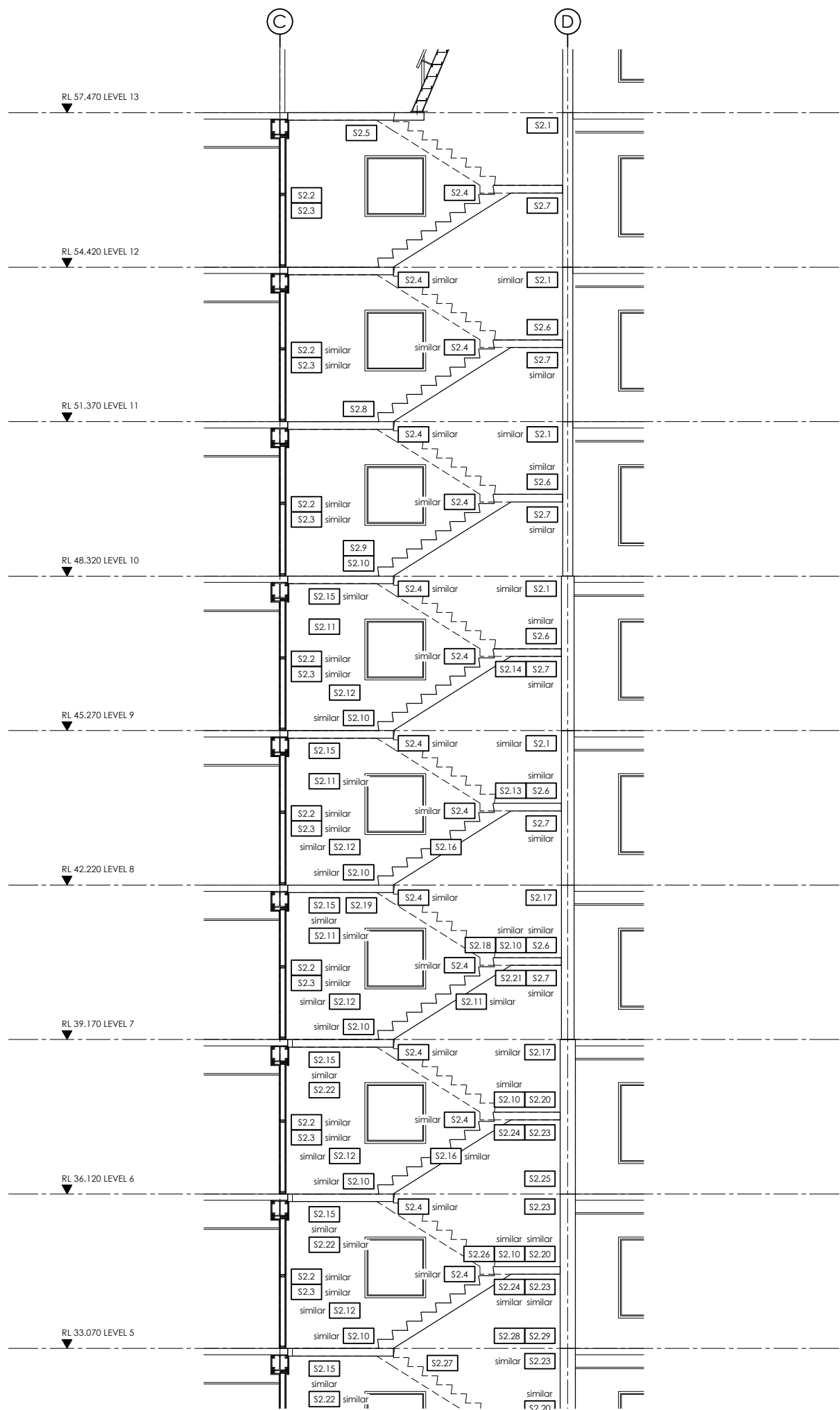
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CATHEDRAL SQUARE

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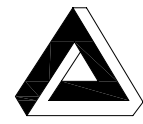
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REFER TO ARCHITECT'S DRAWING FOR ALL SETOUTS



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REV.	DATE	AMENDMENT	BY

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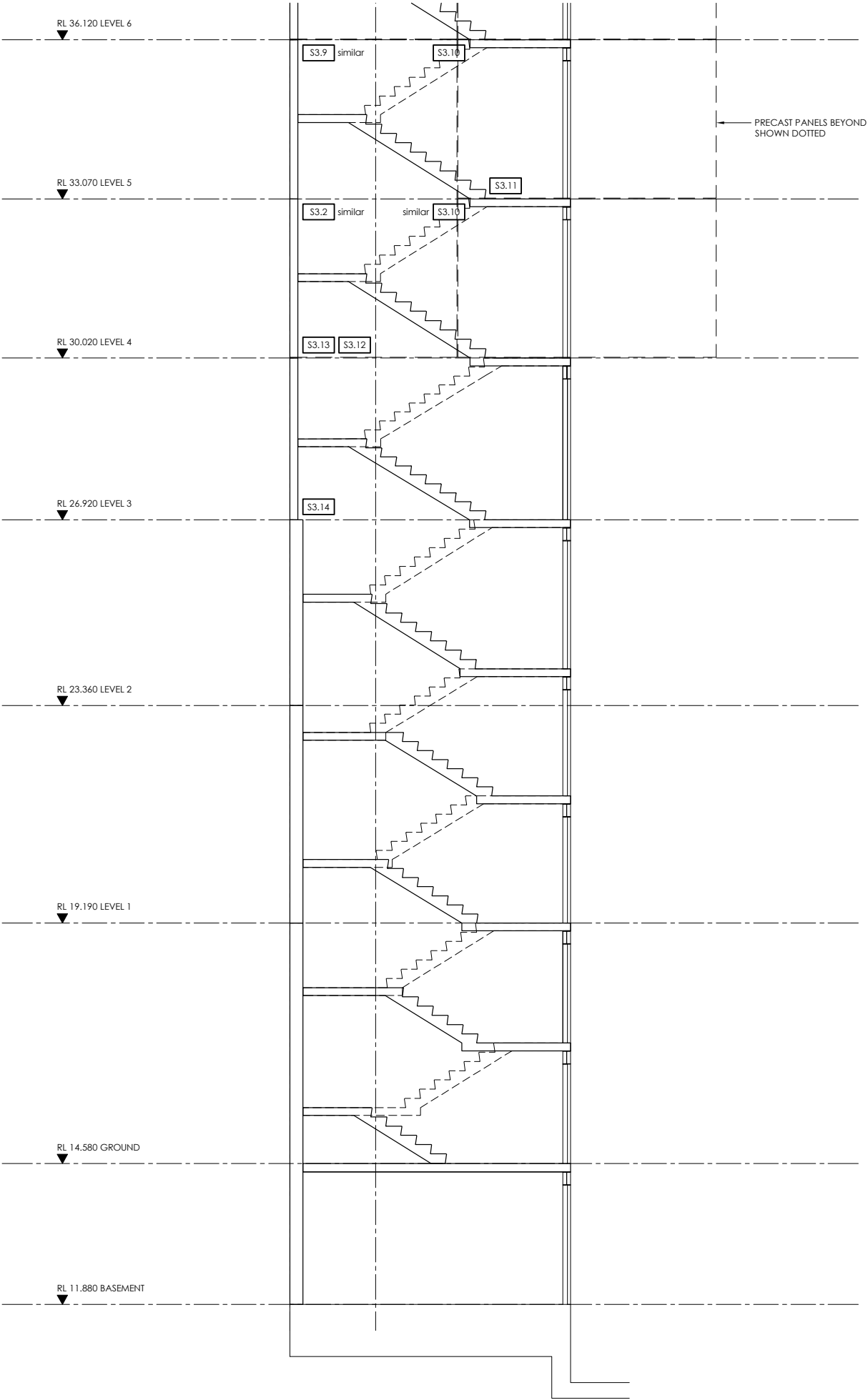
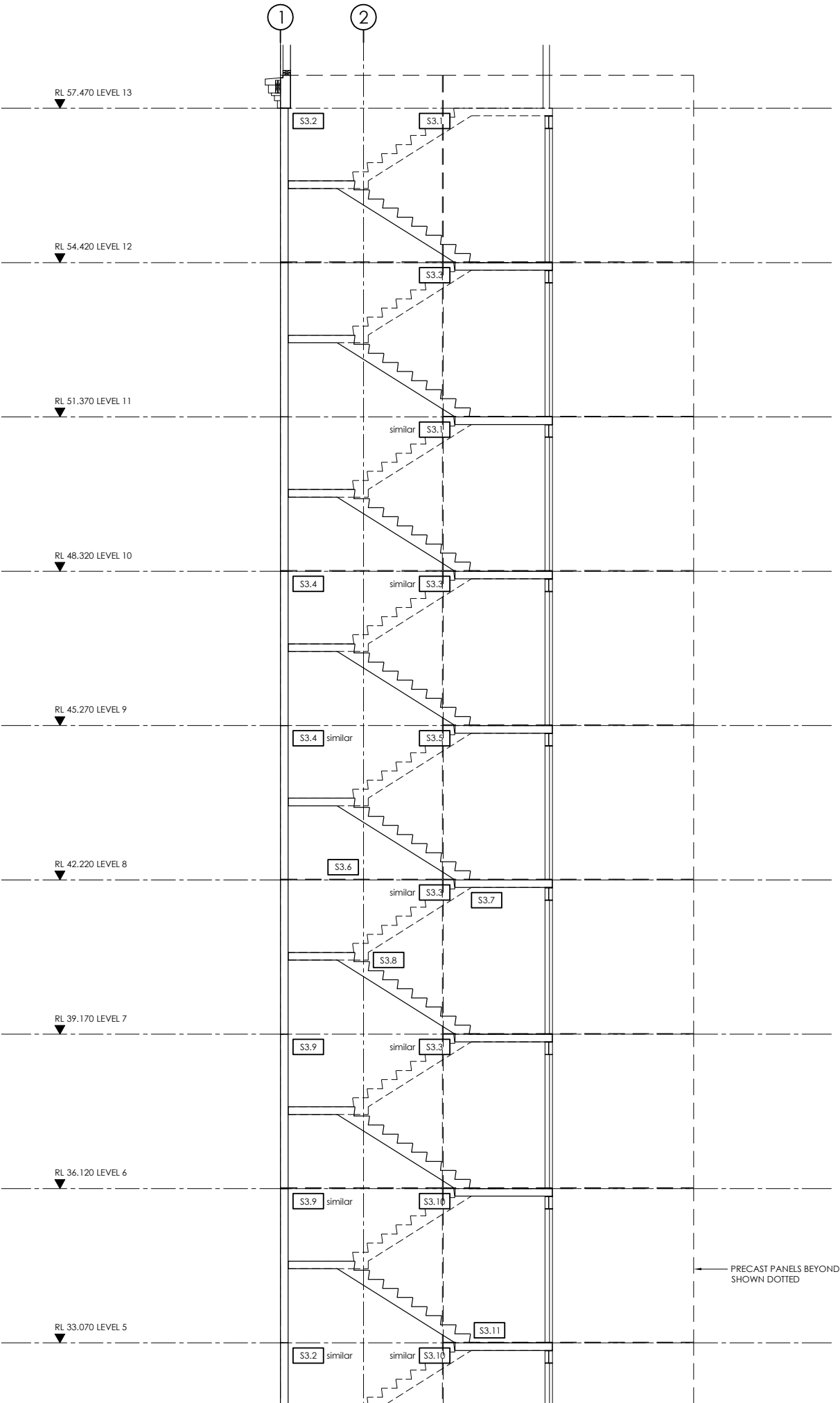
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CATHEDRAL SQUARE**

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**STAIR 3 ELEVATION  
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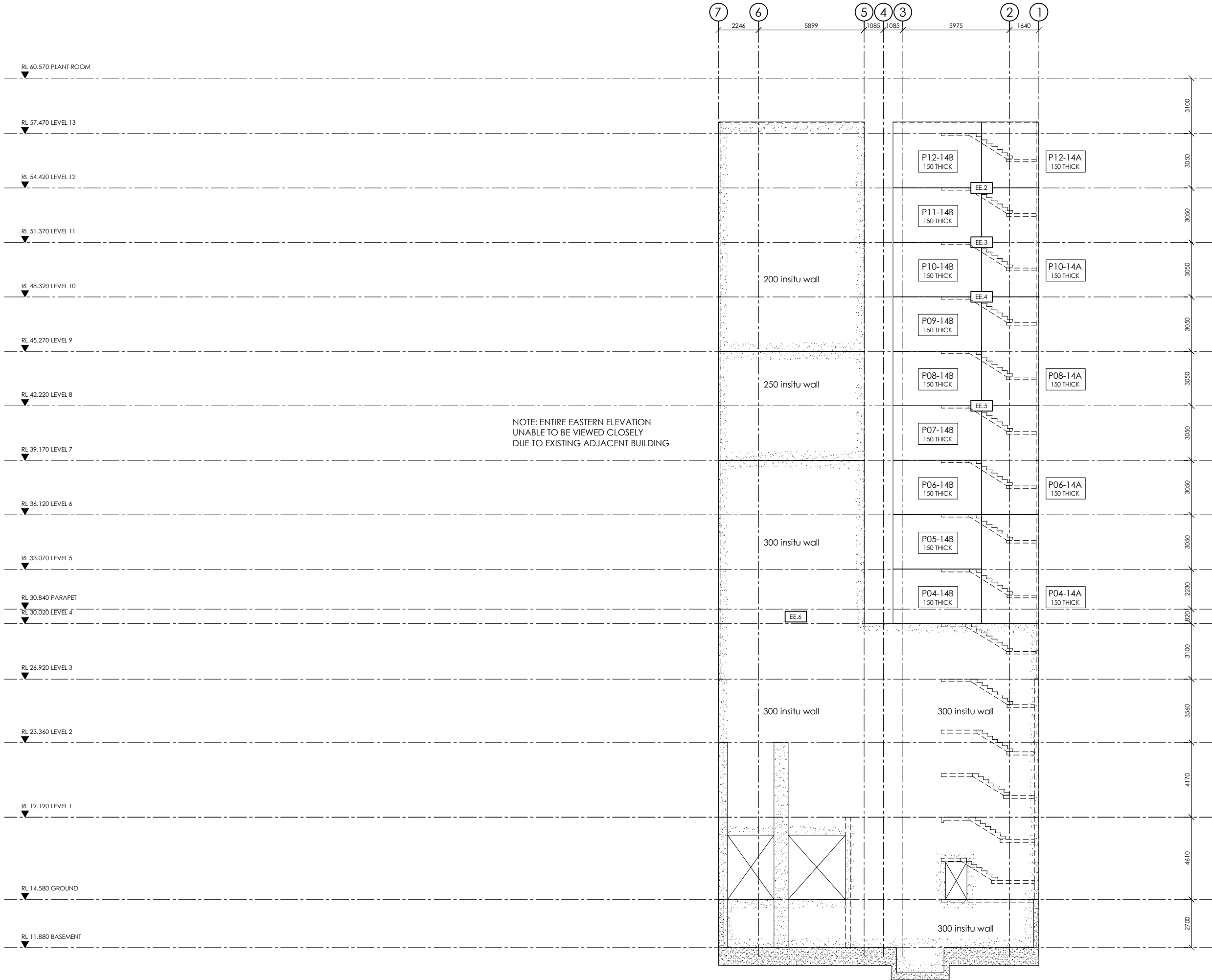
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REFER TO ARCHITECT'S DRAWING FOR ALL SETOUTS



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REV.	DATE	AMENDMENT	BY

ARCHITECT:





**lewis bradford**  
CONSULTING ENGINEERS

PROJECT:

**NOVOTEL**  
**CATHEDRAL SQUARE**

DRAWING TITLE:

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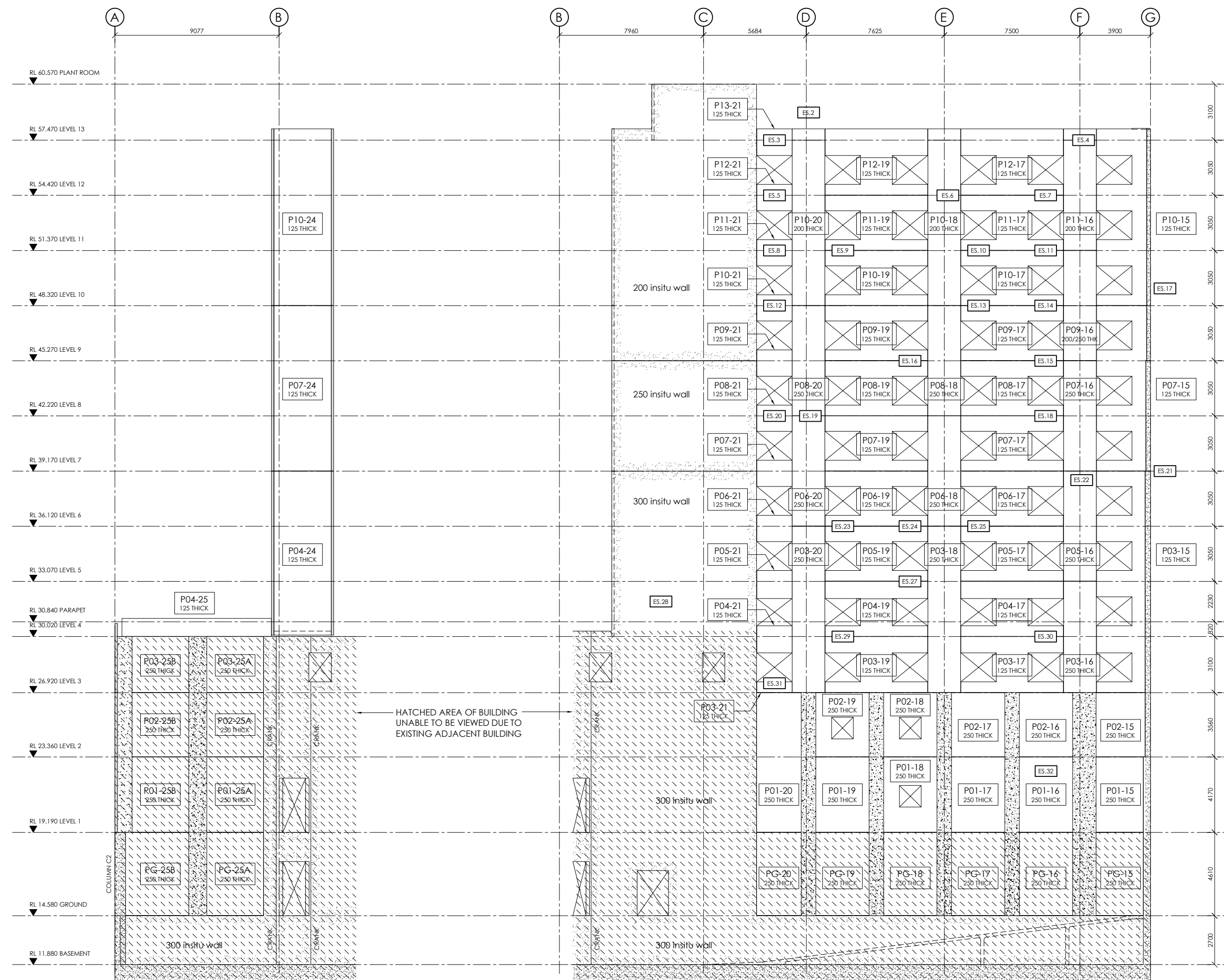




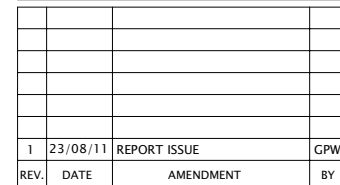
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**SOUTH ELEVATION  
PHOTO REFERENCES**

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CONTRACTOR TO VERIFY ALL DIMENSIONS ON SITE  
REFER TO ARCHITECT'S DRAWING FOR ALL SETOUTS



ARCHITECT:



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CONSULTING ENGINEERS

PROJECT:

NOVOTEL  
CATHEDRAL SQUARE

DRAWING TITLE:

WEST ELEVATION  
PHOTO REFERENCES

DRAWN: \_\_\_\_\_

ENGINEER:	GPW
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ENGINEER. **AJW**

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FILE:

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	DRAWING NO.
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# APPENDIX B

## Repair Schedule





## The Novotel Cathedral Square – Repair Schedule

This appendix details the repair work required to the existing structural elements that have been damaged by the 22/02/11 earthquake (and subsequent aftershocks up to the date of site inspections). The repair schedule describes the work required to return the damaged areas to a similar, acceptable, standard in line with before the earthquake. Note this schedule includes damage to structural steelwork, precast reinforced concrete, insitu reinforced concrete and structural timberwork only. Refer to Architect/client for damage to superficial non-structural elements.

### Repair Work

#### Products

All products specified below as part of the repairs shall be applied in strict accordance with the manufacturer's instructions. This specifically includes the surface preparation of the existing substrates, such as the scabbling back of existing concrete surfaces and the abrasive cleaning of existing reinforcing. All products shall be applied and installed by approved sub-contractors only. All sub-contractors shall provide producer statements to the main contractor upon the completion of the works.

#### Repair N

No repair work necessary.

#### Repair A

Superficial repair work required, non-structural elements. Generally repair in strict accordance with original architectural specification for building.

#### Repair BW

Repair work required to proprietary timber framed plasterboard lined braced wall element. Remove all areas of damaged linings, thoroughly inspect and repair any damage to existing timber framing and install new plasterboard linings in strict accordance with manufacturer's instructions. Install additional layers of plasterboard over braced linings as required to achieve acoustic and fire ratings. Complete in conjunction with *Repair Timber-1* noted below.

#### Repair WP

Repair work required to existing waterproofing membrane to be completed in conjunction with repair work to structural elements. Following the repair and reinstatement of the structural elements the waterproof membrane shall be repaired/reinstated by an approved subcontractor in strict accordance with the manufacturer's instructions. Upon completion of the repairwork the installer shall provide a guarantee for the membrane in accordance with the original guarantee requirements for the project.

#### Repair Services-1

All services/ductwork support brackets, tie rods, braces, cables, clips and the like shall be thoroughly inspected by the relevant subcontractor. Any damage shall be repaired in accordance with expert trade practice. Notify the engineer if any damage to services has caused damage to the structure





## **Concretework Elements**

### **Repair C1**

Hairline to minor cracking to existing concrete element. Remove loose debris and/or any surface coatings then carefully clean out existing crack. Epoxy inject crack in strict accordance with Sika specification and details. Core samples of epoxy injected cracks shall be completed on site (to non-critical areas) and compression tested by an independent laboratory to verify that the epoxy injection process is reinstating the original condition of the concrete. Recoat to match existing if required.

### **Repair C2**

Minor to moderate cracking to existing concrete element. Carefully break out all loose concrete and remove any surface coatings. Prepare existing substrate to receive tack coat. Apply Sikadur 32 tack coat to prepared surface. Apply Sikadur 41 patching mortar to crack area, while tack coat is still wet. Recoat/refinish to match existing if required.

### **Repair C3**

Significant cracking to edge of precast panel element. Prop existing panel. Sawcut a nominal 10mm deep edge around the area to be repaired. Carefully break out and remove existing cracked concrete areas locally. Prepare existing substrate to receive primer coat. Apply Sika Monotop Primer coat to all surfaces. Apply Sika Monotop Structural Mortar to reinstate edge of concrete.

### **Repair C4**

Spalling of existing concrete from structural concrete element. Carefully remove any surface coatings and break out all existing loose/drummy concrete back to competent/solid concrete. Prepare existing substrate to receive primer coat. Apply Sika Monotop Primer bond coat (To all concrete surfaces and any exposed reinforcing steelwork) and Sika Monotop Structural Mortar in strict accordance with manufacturer's details.

### **Repair C5**

Spalling and cracking to existing drypacked or butt jointed vertical panel joint. Prop existing floor locally adjacent to the end of panel. Remove any temporary bolted steel brackets. Carefully remove all existing mortar drypack from vertical joint. Carefully sawcut the edge of the panel to provide a clear 25mm vertical gap to the adjacent concrete element. Seal the interior and exterior faces of the joint with a suitable flexible sealant. Refer to structural drawings in Appendix E for details.

### **Repair C6**

Significant cracking and damage to precast façade panels. Prop floor locally adjacent to cladding panels. Carefully break out and remove precast cladding panels where noted. Complete repair work to structural precast panels as per repair C4 and C1. Install new cladding system to suit existing structural layout. Refer to Appendix E for extent of repair works.

### **Repair C7 – Grid B Cladding Panels**

Severe damage to precast façade panels and adjacent areas of floor between levels 4-13. Carefully break out and remove façade panels and adjacent local area of floors. Retain all existing floor reinforcing. Reinstall floors as per repair C11. Install new cladding system to suit existing structural layout. Refer to Appendix E for extent of repair works.

### **Repair C8**

Local area of pre-existing exposed reinforcing steel has been observed. This area of reinforcing shall be thoroughly cleaned and all laitance removed. All existing concrete surfaces shall be prepared to receive primer coat. Apply Sika Monotop Primer bond coat (To all concrete surfaces and any exposed reinforcing steelwork). Form up edge and flood with high strength Sika Micro-concrete to completely fill voids.



**Repair C9**

Spalling to plasterwork and minor hairline cracking to local areas of concretework to the grid D/grid 1 wall joint. Carefully remove all existing surface coatings to both sides of the joint from level 4 up to roof level. Remove all existing drypack mortar, concrete and polystyrene to create clean 25mm wide joint. Install new flexible sealant to both sides of the joint full height. Complete minor repair work to grid D wall as per C10 below. Reinstate surface coatings to match existing up to either side of flexible sealant joint.

**Repair C10 – Applies to all 300mm Thick Structural Concrete Walls**

Cracking to hinge zone of main structural walls. Carefully break out and remove existing surface coatings to expose full extent of concrete wall to interior and exterior faces. Epoxy inject all hairline cracks using Sika epoxy injection system. Core samples of epoxy injected cracks shall be completed on site (to non-critical areas) and compression tested by an independent laboratory to verify that the epoxy injection process is reinstating the original condition of the concrete. Reinstate surface coatings to match existing with flexible sealant joints between walls where required. Refer also to **Repair Wall-1** detailed below for further investigation work required specifically to the grid 1 and grid 7 walls.

**Repair C11**

Moderate damage to existing concrete element and/or significant spalling of concrete. Carefully break out and remove damaged area of concrete and/or flooring back to a vertical face of sound undamaged concrete. Retain all existing reinforcing, do not cut/damage reinforcing under any circumstances. Remove and reinstate flooring locally as required. Install formwork, apply Sikadur 32 tack coat to all existing concrete surfaces and pour new 30MPa concrete infill, well vibrated into place.

**Repair C12**

Moderate cracking and spalling to local areas of insitu concrete landing. Prop existing landing. Carefully break out and remove all damaged concretework back to a vertical face of sound undamaged concretework. Install formwork, apply Sikadur 32 tack coat to all existing concrete surfaces and pour new 30MPa concrete infill, well vibrated into place. Once concrete infill is cured carefully, flush cut a 900mm length of landing away from the grid D wall at the grid 1 end, 10mm wide. Install suitable flexible sealant top and bottom of sawcut.

**Repair C13**

Moderate damage to local area of existing structural wall. Carefully break out and remove all damaged concrete, existing surface coatings and non-structural materials (sealant/foam) back to sound undamaged concrete surface. Retain all existing reinforcing, do not cut/damage reinforcing under any circumstances. Apply Sika Monotop Primer bond coat (To all concrete surfaces and any exposed reinforcing steelwork). Form up edge and flood with high strength non-shrink grout to completely fill voids. Epoxy inject any remaining hairline cracks as per C10 above.

**Repair C14**

Significant spalling of plasterwork and/or concrete cracking around existing weldplate in precast panel. Break out and remove all surface coatings and all damaged concrete back to sound undamaged concrete. Retain all existing reinforcing, do not cut/damage reinforcing under any circumstances. Thoroughly clean exposed steelwork and scabble edges of concrete. Apply Sikadur 32 tack coat to all concrete surfaces, install interior face formwork and flood with new Sika Micro-concrete within working time of tack coat (approximately 60mins) Epoxy inject any remaining cracks as per repair C1. Prior to any weldplate repairs starting, the damaged weldplate at level 12 shall have the concrete panel broken completely broken out around the edge of the weldplate and the weldplate and welds ND tested by a suitably qualified technician. Allow the engineer to visually inspect at the time of ND testing. Subject to the welds and inspection being satisfactory all damaged weldplates to the eastern stairs shall be repaired as noted above.



### **300mm Thick Concrete Walls**

#### **Repair Wall-1**

The two 300mm thick concrete walls running east-west on grids 1 and 7 have some significant cracking to the hinge zone of the walls, especially the grid 7 wall. A local area of concrete shall be scabbled out across the largest crack location to expose the vertical wall reinforcing bars. This concrete shall be carefully removed to all four extreme corners of each wall. Suitable ND testing shall be undertaken by a qualified technician to confirm the reinforcing bars are undamaged and results shall be forwarded to the engineer for approval. Contact the engineer to allow a visual inspection of the 4 areas of each wall prior to patch repairs as per Repair C2 and epoxy injection as per Repair C10.

Note that this work shall be coordinated by the Engineer, and peer reviewed by Professor Stephano Pampinin of the University of Canterbury.

### **Structural Steelwork Elements**

#### **Repair Steel-1**

All structural steelwork to the roof and plant deck areas, including connections to weldplates, shall be thoroughly inspected by the structural steelworker for damage. Notify the engineer of any damage and for repair methods.

### **Structural Timberwork Elements**

#### **Repair Timber-1**

All structural timberwork to the level 13, roof and plant deck areas, including connections to steelwork, shall be thoroughly inspected by the contractor for damage. This inspection shall include the timber braced walls at level 13 and connections, the timber roof framing at plant room level and all steelwork connections. It is expected that this will require the removal of linings as part of the inspection and repair process. Notify the engineer of any damage and for repair methods.



# APPENDIX C

## Damage Register



[Y.X] references photos attached to the Appendix D where “Y” refers to the floor level/location and “X” refers to the photo number.

[9.4] would refer to the 4th photo on Level 9.

(X.Y similar] refer to a photo of similar damage to the one mentioned

**(Repair X)** refers to specific repair recommendations in Appendix B

Refer to Plans and Elevations for approximate locations of photos.



## General Notes

### Lining Damage to Accommodation Rooms Levels 3-13

Lining damage to accommodation rooms was observed throughout the building with the most severe damage at upper floor levels (Levels 10, 11, 12 & 13) tapering in severity down to Level 4 to almost non-existent at Level 3. Lining damage observed to Level 3 rooms is noted specifically for each room. The areas of damage are consistent up the building but the extent of the damage varies between levels. Areas of exceptional and/or unusual lining damage are noted specifically for the relevant room.

Typical lining damage observed to accommodation rooms is as follows:

- cracking of linings to all four corners of exterior window
- movement of linings to corners with exterior wall
- movement of linings to corner of main bedroom with bathroom area
- vertical cracking of linings to wall opposite side to bathroom area (typically above TV unit)
- cracking of linings to top corners of doors between inter-connected rooms where present
- cracking of linings above main door to corridor

In addition to this damage, portions of linings have typically been removed to allow inspection of structural items beyond. Corridors typically have cracking/tearing/movement of linings at door and duct openings.

The Level 13 walls at the eastern end of the building (beyond Grid E) are braced timber framed walls and more detailed repairs are required to reinstate the bracing capacity as well as the acoustic and fire ratings required. For these walls refer to **Repair BW** in *Appendix B* for details.

Refer below for a selection of photos showing typical lining damage throughout the building to accommodation rooms and corridors:

- Lining damage to bottom south-west corner of exterior window to Level 13 Room 1303 [LD.1] **(Repair A)**
- Lining damage to top south-east corner of exterior window to Level 9 Room 905 [LD.2] **(Repair A)**
- Lining damage to top south-west corner of exterior window to Level 4 Room 401 [LD.3] **(Repair A)**
- Lining damage to south-east corner of main room with bathroom to Level 10 Room 1002 [LD.4] **(Repair A)**
- Lining damage to eastern wall of Level 13 Room 1303 [LD.5] **(Repair A)**
- Lining damage to eastern wall of Level 7 Room 711 [LD.6] **(Repair A)**
- Lining damage to western wall of Level 4 Room 412 [LD.7] **(Repair A)**
- Lining damage above Level 7 Room 705 inter-connected door through to Room 706 [LD.8] **(Repair A)**
- Lining damage above Level 4 Room 406 inter-connected door through to Room 405 [LD.9] **(Repair A)**
- Lining damage above Level 10 Room 1008 door through to corridor [LD.10] **(Repair A)**
- Lining damage above Level 5 Room 501 door through to corridor [LD.11] **(Repair A)**
- Movement of linings above duct in corridor of Level 13 [LD.12] **(Repair A)**
- Tearing of lining below access panel in corridor of Level 13 [LD.13] **(Repair A)**
- Movement of linings between doors to room 901 & 902 on Level 9 [LD.14] **(Repair A)**
- Portion of lining removed to bottom north-west corner of exterior window for inspection of structural elements to Level 10 Room 1012 [LD.15] **(Repair A)**
- Linings removed to southern wall of Level 3 Room 305 for inspection of structural wall [LD.16] **(Repair A)**



## **General Notes continued**

### **Windows**

- Movement of windows and window seals were observed throughout the building, especially on the upper floor levels. It is recommended that all windows are inspected/repared by a specialist glazing manufacturer/installer. **(Repair A)**

### **Lift Shaft**

- The interior of the lift shaft was not investigated at the times of inspection for this report due to the difficulty of access and lack of electrical power to the building. It is recommended that all lift machinery is thoroughly inspected by original manufacturer/installer. Allow to liaise with the structural engineer to co-ordinate inspection of the liftshaft steelwork. **(Inspection LS-1)**

### **Services/Ductwork**

- All services/ductwork support brackets, tie rods, braces, cables, clips and the like shall be thoroughly inspected by the relevant subcontractor. Any damage shall be repaired in accordance with expert trade practice. Notify the engineer if any damage to services has caused damage to the structure **(Repair Services-1)**





## **Basement Floor**

*Note: The basement floor is typically unlined concrete and blockwork except for the Smoke Lobby, Laundry and Stair areas. No apparent structural issues observed. Minor defects and points of interest are noted below.*

- Mould and water damage to ceiling of Smoke Lobby with dislodged lighting fixture [B.1] **(Repair A & Services-1)**
- Minor shrinkage cracking to south-east area of basement north of ramp. No moisture present. [B.2] **(Repair N)**
- Reference photo of dumped debris from eastern adjacent buildings currently being demolished at the time of photo. Refer also Ground Floor notes. [B.3] **(Repair N)**
- Moisture damage and minor moulding/efflorescence to southern side of bottom of ramp [B.4] **(Repair N)**
- Shrinkage cracking (x 3) to western end of southern wall [B.5] **(Repair N)**
- Moisture damage to underside of Ground Floor slab in north-west corner with minor corrosion damage, most likely due to water leakage from ground floor tenancy [B.6] **(Repair A)**

## **Ground Floor**

*Note: No obvious lining damage observed to Ground Floor. No apparent structural issues observed. Minor defects and points of interest are noted below.*

- Equipment to Main Switch Room has moved [G.1] **(Repair Services-1)**
- Roller door to Delivery Area damaged due to dumped debris from eastern adjacent buildings currently being demolished at the time of inspection [G.2 refer also B.3] **(Repair A)**
- North-east egress door blocked at time of inspection due to dumped debris and unable to be opened [B.3 reference photo]
- Horizontal cracking to plaster finish in northern wall of egress corridor in north-west corner at site of construction joint in wall [G.3] **(Repair A & C1)**
- Mould damage to southern wall of egress corridor in north-west corner due to water leakage from ground floor tenancy, refer also Stair 2 [S2.36] **(Repair A)**

## **Level 1**

*Note: No obvious lining damage observed to Level 1. No apparent structural issues observed. Minor defects and points of interest are noted below.*

- Drummy floor levelling compound to Restaurant area [1.1] **(Repair A)**
- Movement of heavy kitchen equipment in kitchen evident [1.2] **(Repair A)**
- Mould/mildew evident to freezer/cool store Rooms 114, 115 & 120 [1.3] **(Repair A)**

## **Level 2**

*Note: No obvious lining damage observed to Level 2. No apparent structural issues observed. Minor defects and points of interest are noted below.*

- Pantry Area in south-east corner of Level 2 locked – unable to gain access
- Water damage evident in ceiling tiles in south-east corner to south office [2.1] **(Repair A & Services-1)**
- Damage to chandelier in Conference Room [2.2] **(Repair A)**



### **Level 3**

*Note: Lining damage observed to Level 3 rooms is noted specifically for each room. Lining damage observed to Level 4-13 rooms are not noted specifically for each room, but are covered in General Notes above.*

#### **Gym**

- Cracked tile at floor to south-west corner [3.1] **(Repair A)**
- Linings removed to northern wall and structure inspected, no damage observed.

#### **Room Service Room, 301 & 302**

- No apparent structural issues observed. No lining damage observed **(Repair N)**

#### **303**

- Minor lining damage to bottom corners of exterior window **(Repair A)**

#### **304**

- Minor spalling to south-west corner of floor **(Repair C4)**

#### **305**

- Water damage evident to ceiling in north-east corner and on bed mattress below [3.2] **(Repair A & Services-1)**
- Carpet along southern edge of room is wet **(Repair A & Services-1)**
- Damp structural wall on eastern side of exterior window [3.3] **(Repair A)**
- Damp underside of Level 4 slab in south-west corner, no obvious structural damage observed [3.4] **(Repair A & WP)**
- Moisture/dampness apparent in room **(Repair A)**

#### **306**

- Door misaligned and unable to be shut **(Repair A)**
- Moisture/dampness apparent in room **(Repair A)**

#### **307**

- Minor lining damage to eastern corners of exterior window (linings removed from western end). No obvious structural damage observed to structural wall from interior **(Repair A)**
- Butt joint between façade panel and structural wall in south-west corner with evidence of movement [3.5] **(Repair C6)**
- Temporary bracket still in place between façade panel and structural wall in south-west corner [3.5] **(Repair C6)**
- Minor spalling to south-west corner of floor with moisture evident [3.5] **(Repair C4)**

#### **308**

- Lining damage above inter-connected door through to Room 307 [LD.8 similar] **(Repair A)**
- Lining damage to south-west corner of room [LD.4 similar] **(Repair A)**
- Minor lining damage to all four corners of exterior window **(Repair A)**



309

- Door misaligned and unable to be shut **(Repair A)**
- Lining damage to eastern wall above TV unit [LD.6 similar] **(Repair A)**
- Lining damage to south-west corner of room [LD.4 similar] **(Repair A)**
- Minor lining damage to all four corners of exterior window **(Repair A)**

310

- Lining damage to western wall [LD.6 similar] **(Repair A)**
- Minor lining damage to all four corners of exterior window **(Repair A)**

311

- Door misaligned and unable to be shut **(Repair A)**
- Lining damage above main door through to corridor [LD.10 similar] **(Repair A)**
- Lining damage to north-west corner of room with bathroom [LD.4 similar] **(Repair A)**
- Lining damage to northern wall **(Repair A)**
- Lining damage to south-west corner of room [LD.4 similar] **(Repair A)**
- Minor lining damage to all four corners of exterior window **(Repair A)**

312

- Minor lining damage to all four corners of exterior window **(Repair A)**
- Linings removed to eastern wall – no obvious damage observed to structural wall **(Repair A)**
- Minor spalling to south-east corner of floor **(Repair C4)**
- Very small joint between façade panel and structural wall in south-east corner **(Repair C6)**
- Minor spalling to façade panel in south-east corner **(Repair C4)**

313

- Door misaligned and unable to be shut **(Repair A)**
- Lining damage to south-west corner of room with bathroom [LD.4 similar] **(Repair A)**
- Lining damage to north-west corner of room [LD.4 similar] **(Repair A)**
- Minor lining damage to all four corners of exterior window **(Repair A)**
- Spalling to façade panel in north-west corner [3.6 & 3.7] **(Repair C6)**

314

- Minor lining damage to eastern wall above TV unit [LD.7 similar] **(Repair A)**
- Lining damage to north-east corner of room [LD.4 similar] **(Repair A)**
- Minor lining damage to all four corners of exterior window **(Repair A)**
- Spalling to façade panel in north-east corner [3.8 & 3.9] **(Repair C6)**
- Flexible sealant to joint between façade panel and structural wall observed in north-west corner [6.8 similar] **(Repair N)**

315

- Lining damage to south-west corner of room with bathroom [LD.4 similar] **(Repair A)**
- Spalling to façade panel in north-west corner [3.10] **(Repair C6)**
- Mortar packing behind flexible sealant between façade panel and structural wall in north-east corner [4.13 similar] **(Repair C6)**



316

- Linings removed to western wall – no damage observed to structural wall (**Repair A**)
- Solid mortar packing to joint between façade panel and structural wall in north-west corner (**Repair C6**)
- Spalling to façade panel in north-east corner [3.11] (**Repair C6**)

**Level 4**

*Note: Lining damage observed to Level 4-13 rooms is not noted specifically for each room, but is covered in General Notes above.*

401

- Minor spalling to north-west corner of floor (**Repair C4**)
- Hairline cracking was observed to hinge zone of structural wall and further investigation works are required (**Repair Wall-1 & C10**)
- Temporary bracket in north-west corner adjacent to grid 1 to be removed [4.1]
- Moisture/dampness apparent in room (**Repair A**)

402

- Minor spalling to north-west corner of floor (**Repair C7**)
- Moisture/dampness apparent in room (**Repair A & WP**)

403

- Minor spalling to north-west corner of floor (**Repair C7**)
- Moisture/dampness apparent in room (**Repair A & WP**)

404

- Water damage evident to southern side of room [4.2] (**Repair A & WP**)
- Moisture/dampness apparent in room (**Repair A**)
- Further inspection of southern wall is required following removal of linings and demolition/securing of adjacent building to the south (**Repair C5**)

Level 4 Western Deck Area (accessed from Rooms 401-404)

- Tearing to waterproofing membrane in north-east corner of deck area by lightwell [4.3] (**Repair WP**)
- Debris from northern adjacent building on deck area which may have damaged waterproofing membrane [4.4] (**Repair WP**)
- Damage to flashing on northern edge [4.4] (**Repair A**)
- Movement of structure evident in waterproofing membrane to south-west corner [4.5] (**Repair C1 & WP**)
- Debris from southern adjacent building on deck area which may have damaged waterproofing membrane [4.6] (**Repair WP**)
- Note: refer to Western Elevation section for damage to base of façade panels to Rooms 401-404



House Keeping Room

- Minor spalling to south-west corner of floor [5.4 similar] **(Repair C11 & C5)**
- Approximately 12 horizontal hairline cracks in grid 7 structural wall up to 0.8mm wide [4.7 & 4.8] **(Repair Wall-1 & C10)**
- Moisture/dampness apparent in room **(Repair A)**

405

- Approximately 7-8 horizontal hairline cracks to structural wall in south-west corner [4.9 & 4.10] **(Repair Wall-1 & C10)**
- Local areas of very minor spalling to eastern end of structural wall [4.10] **(Repair Wall-1)**
- Façade panel butts into structural wall in south-west corner [6.9 similar] **(Repair C5)**
- Approximately 5mm mortar packing to joint between façade panel and structural wall in south-east corner [4.11] **(Repair C6)**
- Significant spalling to south-east corner of floor [4.11] **(Repair C11)**

406

- Butt joint between façade panel and structural wall in south-west corner, movement of façade panel observed [4.12] **(Repair C6)**

407

- 10mm mortar packing to joint between façade panel and structural wall in south-east corner, notable movement of façade panel observed [4.12 similar] **(Repair C6)**

408

- Butt joint between façade panel and structural wall in south-west corner, notable movement of façade panel observed [4.12 similar] **(Repair C6)**

409

- Solid packing to joint between façade panel and structural wall in south-east corner, notable movement of façade panel observed [4.12 similar] **(Repair C6)**

410

- Spalling to south-west corner of floor **(Repair C11)**
- Mortar packing behind flexible sealant between façade panel and structural wall in south-west corner **(Repair C6)**
- Solid packing to joint between façade panel and structural wall in south-east corner [4.12 similar] **(Repair C6)**

411

- Door misaligned and unable to be shut **(Repair A)**
- Butt joint between façade panel and structural wall in north-east corner [4.13] **(Repair C6)**
- Significant spalling to façade panel in north-east corner [4.13] **(Repair C6)**



412

- Approximately 10mm mortar packing to joint between façade panel and structural wall in north-west corner [4.12 similar] **(Repair C6)**

413

- Cracking and spalling damage to façade panel [4.12 similar] **(Repair C6)**
- Local spalling of façade panel in north-east corner **(Repair C6)**

414

- No obvious damage observed to insitu concrete floor diaphragm along grid D wall.
- Pre-existing exposed reinforcing to northern structural wall at junction with western structural wall [4.14] **(Repair C8)**
- Hairline cracking to end of northern structural wall **(Repair Wall-1 & C10)**
- Approximately 20mm concrete joint between façade panel and structural wall in north-west corner **(Repair C6)**
- Hairline cracking and local drummy areas of floor levelling compound in corridor by door to Room 414 [4.15] **(Repair A & C1)**

**Level 5**501

- Minor spalling to south-west corner of floor **(Repair C7)**
- Façade panel observed to have moved outwards by approximately 5mm [5.1] **(Repair C7)**
- Spalling to floor in north-west corner adjacent to gridline 1 **(Repair C4)**

502

- Door misaligned and unable to be shut **(Repair A)**
- Spalling to north-west corner of floor **(Repair C7)**
- Façade panel observed to have moved outwards by approximately 10mm **(Repair C7)**

503

- Door locked – unable to gain access. Damage assumed to be similar to Rooms 603 & 403

504

- Approximately 30-40mm outwards movement to façade panel with small area of local spalling and hairline cracks to panel [5.2 & 5.3] **(Repair C7)**
- Minor spalling and damage to south wall cladding panel **(Repair C5)**

**House Keeping Room**

- Minor spalling to south-west corner of floor [5.4] **(Repair C11 & C5)**
- Linings removed from southern wall – no damage observed to structural wall **(Repair A)**
- No damage observed to underside of level 6 floor slab **(Repair N)**



505

- Approximately 5mm joint between façade panel and structural wall in south-west corner [5.5] **(Repair C6)**
- Approximately 2-3mm flexible sealant to joint between façade panel and structural wall in south-east corner [5.6] **(Repair C6)**
- Spalling to south-east corner of floor [5.6] **(Repair C11)**

506

- Approximately 5mm flexible sealant to joint between façade panel and structural wall in south-west corner with some signs of movement [5.6 similar] **(Repair C6)**
- Minor spalling to south-west corner of floor **(Repair C11)**

507

- Butt joint between façade panel and structural wall in south-east corner with approximately 3mm outwards movement of façade panel [5.6 similar] **(Repair C6)**
- Minor spalling to south-east corner of floor **(Repair C11)**

508

- Severe spalling and significant damage to exterior of cladding panel [6.8 similar] **(Repair C6)**
- Spalling to south-west corner of floor [6.8 similar] **(Repair C11)**

509

- Door misaligned and unable to be shut **(Repair A)**
- Severe spalling and significant damage to exterior of cladding panel and very tight joint to structural wall in south-east corner **(Repair C6)**
- Spalling to south-east corner of floor [6.8 similar] **(Repair C11)**

510

- Door misaligned and unable to be shut **(Repair A)**
- Façade panel butts into structural wall with approximately 1mm flexible sealant in south-west corner [5.7] **(Repair C6)**
- Spalling to south-west corner of floor [5.7] **(Repair C11)**
- Tight joint between façade panel and structural wall in south-east corner **(Repair C6)**
- Minor spalling to south-east corner of floor **(Repair C11)**

511

- Spalling to north-east corner of floor **(Repair C11)**
- Spalling to edge of panel and tight joint between façade panel and structural wall in north-east corner [5.8] **(Repair C6)**

512

- Spalling to edge of panel and tight joint between façade panel and structural wall in north-east corner [5.8 similar] **(Repair C6)**
- Minor spalling to north-west corner of floor **(Repair C11)**
- Minor spalling to north-east corner of floor **(Repair C11)**





513

- Door misaligned and unable to be shut **(Repair A)**
- Spalling to north-east and north-west corners of floor **(Repair C11)**
- Diagonal cracking up to approximately 1.5mm wide to western end of façade panel with significant areas of local spalling and damage to base of panel [5.10 & 5.11] **(Repair C6)**
- Complete loss of drypack to base of façade panel at western end [5.11] **(Repair C6)**

514

- Spalling to north-west corner of floor **(Repair C11)**
- Approximately 15mm mortar packing to joint between façade panel and structural wall in north-west corner [5.9 similar] **(Repair C6)**
- Minor cracking to base of structural wall in north-west corner **(Repair Wall-1 & C10)**
- Diagonal cracking up to approximately 1.5mm wide to eastern end of façade panel with areas of local spalling [5.12] **(Repair C6)**

Level 6601

- Spalling to north-west corner of floor **(Repair C7)**
- Large area of spalling to south-west corner of floor **(Repair C7)**
- Façade panel observed to have moved outwards by approximately 5mm **(Repair C7)**

602

- Spalling to north-west corner of floor [6.1] **(Repair C7)**
- Approximately 20mm outwards movement to façade panel [6.1] **(Repair C7)**

603

- Door stiff but able to be shut **(Repair A)**
- Spalling to north-west corner of floor **(Repair C7)**
- Spalling to south-west corner of floor **(Repair C7)**
- Approximately 30mm outwards movement to façade panel with small area of local spalling and hairline cracks to panel [6.2] **(Repair C7)**

604

- Minor spalling to north-west corner of floor **(Repair C7)**
- Minor spalling to south-west corner of floor **(Repair C7)**
- Approximately 20mm outwards movement to façade panel with small area of local spalling and hairline cracks to panel [6.3 & 6.4] **(Repair C7)**
- Minor spalling and damage noted to cladding panel to south wall **(Repair C5)**

House Keeping Room

- Minor spalling to south-west corner of floor [6.5] **(Repair C11 & C5)**
- Linings removed from southern wall – no obvious structural damage observed **(Repair N)**



605

- Façade panel butts into structural wall with 0mm gap in south-west corner [6.6] **(Repair C6)**
- Severe spalling of façade panel in south-east corner [6.7] **(Repair C6)**
- Spalling to south-east corner of floor **(Repair C11)**

606

- Tight joint between façade panel and structural wall in south-west corner with notable cracking and damage to cladding panel **(Repair C6)**

607

- Significant cracking to cladding panel to south-east corner **(Repair C6)**

608

- Wide flexible sealant to joint between façade panel and structural wall observed in south-west corner [6.8] **(Repair N)**
- Spalling to south-west corner of floor [6.8] **(Repair C11)**
- Moisture observed in south-west corner of floor [6.8] **(Repair A)**

609

- Door misaligned and unable to be shut **(Repair A)**
- Wide flexible sealant to joint between façade panel and structural wall observed in south-east corner [6.8 similar] **(Repair N)**
- Spalling to south-east corner of floor [6.8 similar] **(Repair C11)**
- Moisture observed in south-east corner of floor [6.8 similar] **(Repair A)**

610

- Façade panel butts into structural wall with 0mm gap in south-west corner [6.9] **(Repair C6)**
- Spalling to south-west corner of floor **(Repair C11)**
- Butt joint between façade panel and structural panel in south-east corner with notable cracks to façade panel [6.10] **(Repair C6)**

611

- Minor spalling to north-east corner of floor [6.11] **(Repair C4)**
- No interior sealant to joint between façade panel and structural wall in north-east corner. Mortar packing to exterior face of joint observed [6.11] **(Repair C6)**

612

- Mortar packing behind flexible sealant between façade panel and structural wall in north-west corner [6.12] **(Repair C6)**
- Cracking/spalling to façade panel in north-west corner [6.12] **(Repair C6)**



613

- Mortar packing behind flexible sealant between façade panel and structural wall in north-east corner [6.12 similar] **(Repair C6)**
- Significant cracking/spalling to façade panel in north-east corner [6.12 similar] **(Repair C6)**

614

- Cracking and spalling to façade panel and butt joint to structural wall [6.13] **(Repair C6)**
- Minor spalling to north-west corner of floor [6.14] **(Repair C11)**

**Level 7**701

- Spalling to north-west corner of floor **(Repair C7)**
- Large area of spalling to south-west corner of floor **(Repair C7)**
- Façade panel observed to have moved outwards by approximately 10mm **(Repair C7)**

702

- Spalling to north-west corner of floor **(Repair C7)**
- Approximately 20mm outwards movement to façade panel with small area of local spalling to panel [7.1] **(Repair C7)**

703

- Door locked – unable to gain access. Damage assumed to be similar to Rooms 903 & 603

704

- Large vertical crack to western wall linings [7.2] **(Repair A)**
- Approximately 30mm outwards movement to façade panel with small area of local spalling and hairline cracks to panel [7.3] **(Repair C7)**
- Minor spalling and damage noted to cladding panel to south wall **(Repair C5 & C4)**

**House Keeping Room**

- Cracking/spalling along western edge of floor [7.4] **(Repair C11 & C5)**

705

- Façade panel butts into structural wall with 0mm gap in south-west corner with large lump of grout at base. [7.5] **(Repair C6)**
- Spalling to south-east corner of floor **(Repair C11)**

706

- Façade panel butts into structural wall with 0mm gap in south-west corner, movement of panel noted [7.6] **(Repair C6)**
- Spalling to south-west corner of floor **(Repair C11)**



707

- Uneven joint between façade panel and structural wall in south-east corner with notable areas of concrete butting together [7.7] **(Repair C5)**
- Spalling to south-east corner of floor [7.7] **(Repair C11)**

708

- Mortar packing behind flexible sealant between façade panel and structural wall in south-west corner [7.7 similar] **(Repair C6)**
- Spalling to south-west corner of floor [7.7 similar] **(Repair C11)**

709

- Tight joint between façade panel and structural wall in south-east corner [7.8] **(Repair C6)**
- Spalling to south-west corner of floor [7.7 similar] **(Repair C11)**

710

- Façade panel butts into structural wall with 0mm gap in south-west corner [7.6 similar] **(Repair C6)**
- Spalling to south-west corner of floor **(Repair C11)**
- Approximately 15mm mortar packing to joint between façade panel and structural wall in south-east corner with significant spalling to panel **(Repair C6)**
- Spalling to south-east corner of floor **(Repair C11)**

711

- Spalling to north-east corner of floor [7.9] **(Repair C11)**
- Joint between façade panel and structural wall in north-east corner with wide flexible sealant [7.9] **(Repair N)**

712

- Door misaligned and unable to be shut **(Repair A)**
- Mortar packing to joint between façade panel and structural wall in north-west corner which has fallen out [7.10] **(Repair C6)**
- Spalling to north-west corner of floor [7.10] **(Repair C11)**

713

- Approximately 5mm joint between façade panel and structural wall in north-east corner [7.11] **(Repair C6)**
- Temporary bracket still in place between façade panel and structural wall in north-east corner [7.11] **(Repair C6)**
- Spalling to north-east corner of floor [7.11] **(Repair C11)**

714

- Butt joint between façade panel and structural wall in north-west corner with evidence of movement, significant damage to exterior of panel [7.12] **(Repair C6)**
- Minor spalling to north-west corner of floor **(Repair C11)**



**Level 8**

- Level 8 rooms were visually inspected for damage. Damage was observed to be generally similar to Level 9 above for accommodation rooms. Refer to level 9 for typical damage and suggested repairs.

**Level 9****901**

- Spalling of south-west corner of floor [9.1] **(Repair C7)**
- 10mm outwards movement of façade panel [9.1] **(Repair C7)**

**902**

- Spalling of north-west corner of floor [9.1 similar] **(Repair C7)**
- 5-7mm outwards movement of façade panel [9.1 similar] **(Repair C7)**

**903**

- Approximately 45mm outwards movement of façade panel [9.2] **(Repair C7)**

**904**

- Approximately 45mm outwards movement of façade panel [9.2 similar] **(Repair C7)**
- Minor spalling and damage noted to cladding panel to south wall **(Repair C5 & C4)**

**House Keeping Room**

- Unable to access on Level 9 (& Level 8) due to locked security door in place. Damage assumed to be similar to Level 10 above and Level 7 below **(Repair C11 & C5)**

**905**

- Spalling to south-east corner of floor [9.3] **(Repair C11)**
- Cracking to façade panel in south-east corner, approximately 5mm panel joint [9.3] **(Repair C6)**
- Spalling to south-west corner of floor [9.3 similar] **(Repair C11)**
- Hairline cracking to façade panel in south-west corner [9.3 similar] **(Repair C6)**
- Drummy FLC to tiled edge [9.7 similar] **(Repair A)**
- Significant cracking to tiles in bathroom [9.4 & 9.5] **(Repair A)**

**906**

- Spalling to south-west corner of floor [9.6] **(Repair C11)**
- Drummy FLC to adjacent south-west floor area **(Repair A)**
- Damage to façade panel in south-west corner, butt joint [9.6] **(Repair C6)**
- Significant Gib cracking by bathroom **(Repair A)**
- Drummy FLC to tiled edge [9.7] **(Repair A)**



907

- Movement observed to joint sealant between façade panel and structural in south-east corner with hairline cracking to panel **(Repair C6)**

908

- Spalling/cracking to south-west corner of floor [9.8] **(Repair C11)**
- Severe panel damage to façade panel in south-west corner at ceiling level [9.9] **(Repair C6)**

909

- Façade panel butts into structural wall in south-east corner with 0mm gap [9.10] **(Repair C6)**
- 5-10mm outwards movement of façade panel observed [9.10] **(Repair C6)**

910

- Door misaligned and unable to be shut **(Repair A)**
- Drummy FLC to tiled edge [9.7 similar] **(Repair A)**
- Minor spalling to south-west corner of floor **(Repair C11)**
- Minor spalling to south-east corner of floor and butt panel joint at corner **(Repair C11 & C6)**

911

- Door forcibly opened [9.11] **(Repair A)**
- Significant spalling to north-east corner of floor [9.12] **(Repair C11 & C5)**

912

- Minor spalling to floor in north-west corner **(Repair C11)**
- Significant spalling to façade panel in north-west corner [9.13] **(Repair C6)**

913

- Spalling/cracking to floor in north-east corner [9.14] **(Repair C11)**
- Severe spalling and diagonal cracking to north-west corner of façade panel at ceiling level [10.20 similar] **(Repair C6)**
- Cracking to window sill section of façade panel in north-west corner [10.22 similar] **(Repair C6)**
- Strange smell observed in room – unable to identify source **(Repair A)**

914

- Spalling/cracking to floor in north-west corner [9.15] **(Repair C11)**
- Diagonal cracking to eastern end of façade panel [refer 10.20 for continuation similar] **(Repair C6)**

Corridor

- Significant damage to linings observed at this level with joint movement of up to 5mm **(Repair A)**



**Level 10****1001**

- Spalling of north-west corner of floor [10.1 similar] **(Repair C7)**
- Spalling of south-west corner of floor [10.1 similar] **(Repair C7)**

**1002**

- Spalling of north-west corner of floor [10.1] **(Repair C7)**
- Spalling of south-west corner of floor [10.1 similar] **(Repair C7)**

**1003**

- Similar damage to 1002 and 1004 **(Repair C7)**

**1004**

- Door misaligned and unable to be shut **(Repair A)**
- Tiles by door cracked and removed. No obvious damage or cracking to floor observed and floor sounds solid when hit with hammer, no obvious floor damage to floor when viewed from below through access hatch [10.2] **(Repair A)**
- Façade panel moved outwards by approximately 40mm along entire western edge [10.3] **(Repair C7)**
- Significant lining damage to north-east corner of bathroom [10.4] **(Repair A)**
- Vertical cracking to linings on southern wall and minor movement noted from exterior [10.5] **(Repair C5)**

**House Keeping Room**

- Spalling to western edge of floor [10.6] **(Repair C11 & C5)**
- No damage noted to the structural wall **(Repair N)**

**1005**

- Broken exterior window [10.7] **(Repair A)**
- Severe spalling/damage to south-west corner of façade panel at ceiling level (i.e. Level 11 façade panel) with temporary bracket still in place [10.8] **(Repair C6)**
- Severe spalling/damage to south-east corner of façade panel at ceiling level (i.e. Level 11 façade panel) with temporary bracket still in place [10.9] **(Repair C6)**
- Minor spalling to south-west corner of floor **(Repair C11)**
- Significant spalling to south-east corner of floor [10.10] **(Repair C11)**
- Spalling to south-east corner of façade panel [10.11] **(Repair C6)**
- Minor cracking to FLC by tiled areas with notable drummy areas [10.12] **(Repair A)**

**1006**

- Spalling to south-west corner of floor [10.13] **(Repair C11)**
- Damage to south-west corner of façade panel [10.13] **(Repair C6)**
- Cracking/spalling to structural wall in south-west corner of room [10.13] **(Repair C4)**
- Minor cracking to FLC by tiles with notable drummy areas [10.12 similar] **(Repair A)**





1007

- Hairline cracking to south-east corner of façade panel, severe exterior damage [10.14] **(Repair C6)**
- Temporary bracket between façade panel and structural wall still in place [10.14] **(Repair C6)**

1008

- Severe spalling/damage to south-east corner of façade panel at ceiling level [10.15] **(Repair C6)**
- Temporary bracket still in place between façade panel and structural wall in south-west corner [10.16] **(Repair C6)**
- Façade panel butts into structural wall in south-west corner with 0mm gap [10.16] **(Repair C6)**
- Minor spalling to structural wall in south-west corner of room, may be a pre-existing defect [10.16] **(Repair C4)**
- Cracking/spalling to south-east corner of façade panel [10.17] **(Repair C6)**

1009

- Temporary bracket still in place between façade panel and structural wall in south-east [10.18] **(Repair C6)**
- Façade panel butts into structural wall in south-east corner with 0mm gap [10.18] **(Repair C6)**
- Cracking/spalling to structural wall in south-east corner of room [10.18] **(Repair C4)**
- Cracking/spalling to south-east corner of façade panel [10.18] **(Repair C6)**
- Minor spalled area of south-east floor **(Repair C11)**
- Cracking to tiles in bathroom **(Repair A)**

1010

- Door misaligned and unable to be shut **(Repair A)**
- Spalling to south-east corner of floor with hairline cracking [10.19] **(Repair C11)**
- Cracking to façade panel with local spalling in south-east corner [10.19] **(Repair C6)**
- Façade panel butts up to structural wall with 0mm gap in south-east corner [10.19] **(Repair C6)**

1011

- Spalling to north-east corner of floor **(Repair C11)**
- Minor hairline cracking to north-east corner of façade panel **(Repair C6)**

1012

- Minor spalling to floor in north-west corner **(Repair C11)**
- Tight joint between precast façade panel and structural panel **(Repair C6)**



1013

- Severe spalling and diagonal cracking to north-west corner of façade panel at ceiling level [10.20 & 10.21] **(Repair C6)**
- Reinforcing link bar does not loop around trimmer bar [10.21] **(Repair C6)**
- Hairline cracking to façade panel in north-west corner [10.22] **(Repair C6)**
- 5mm outwards movement of façade panel at base observed **(Repair C6)**
- Mortar packing behind flexible sealant between façade panel and structural wall in north-east corner [11.13 similar] **(Repair C6)**
- Minor spalling to floor in north-east corner **(Repair C11)**
- Minor hairline cracking to northern floor edge **(Repair C1)**

1014

- Diagonal cracking to eastern end of façade panel [refer 10.20 for continuation] **(Repair C6)**
- Spalling to floor in north-west corner with minor hairline cracking also along northern edge [10.23] **(Repair C11)**
- Butt joint between façade panel and structural wall in north-west corner [10.24] **(Repair C6)**

Level 111101

- Severe spalling/cracking of floor to entire western edge extending up to 300mm into floor [11.1] **(Repair C7)**

1102

- Severe spalling/cracking of floor to northern end of western edge extending up to 300mm into floor [11.1 similar] **(Repair C7)**

1103 & 1104

- Façade panels to rooms 1103 & 1104 have moved outwards by approximately 35mm [11.2 taken in 1103] **(Repair C7)**
- Minor movement noted to south wall cladding panel from exterior **(Repair C5)**

House Keeping Room

- Spalling to western edge of floor [11.3] **(Repair C11 & C5)**
- Minor hairline crack along southern floor edge, may be pre-existing shrinkage crack **(Repair C1)**

1105

- Spalling to south-west corner of floor **(Repair C11)**
- Severe spalling to south-east corner of façade panel [11.4] **(Repair C6)**



1106

- Drummy FLC noted adjacent to tiled area but floor appears sound [11.5] **(Repair A)**
- Approximately 10mm horizontal movement to base of linings in north-east corner with bathroom **(Repair A)**
- Spalling and damage to south-west corner of façade panel with local floor damage [11.6] **(Repair C6)**
- Cracking and spalling to south-east corner of façade panel [11.7] **(Repair C6)**

1107

- Spalling to south-east corner of façade panel [11.8] **(Repair C6)**
- Minor spalling to south-east corner of floor **(Repair C11)**

1108

- Spalling to south-west corner of façade panel with butt joint to structural wall. 10mm outwards movement to façade panel [11.9] **(Repair C6)**

1109

- Spalling of precast cladding panel with notable outwards movement **(Repair C6)**

1110

- Spalling to south-west corner of façade panel [11.10] **(Repair C6)**
- Spalling to south-east corner of floor [11.11] **(Repair C11)**

1111

- Spalling to north-east corner of façade panel [11.10 similar] **(Repair C6)**
- Spalling to north-east corner of floor [11.11 similar] **(Repair C11)**

1112

- Minor hairline cracking to western end of northern floor edge **(Repair C1)**

1113

- Minor hairline cracking to eastern end of northern floor edge **(Repair C11)**
- Significant cracking to western end of façade panel below window [11.12] **(Repair C6)**
- Notable movement and damage to base of façade panel joint [11.13] **(Repair C6)**

1114

- Significant cracking/spalling to north-east corner of floor [11.14] **(Repair C11)**
- Façade panel butts into structural wall with 0mm gap [11.15] **(Repair C6)**



**Level 12****1201**

- Movement of cladding panel in south-west corner **(Repair C7)**
- Spalling of concrete topping in south-west corner [12.1] **(Repair C7)**

**1202**

- Spalling of concrete topping in north-west corner [12.1 similar] **(Repair C7)**
- 15mm movement of façade panel outwards[12.2] **(Repair C7)**
- Approximately 5mm gap in Gib linings to north wall by end of tiling **(Repair A)**
- Damage to kitchen joinery due to seismic movement **(Repair A)**

**1203**

- Similar to 1202 **(Repair C7)**

**1204**

- Door misaligned and unable to be shut **(Repair A)**
- Joinery has pulled away from wall by 7mm [12.3] **(Repair A)**
- Broken tiles due to movement [12.4] **(Repair A)**
- Severe lining damage to southern wall with movement of precast panel [12.5] **(Repair A & X)**
- Moisture damage to south-west corner at ceiling level [12.6] **(Repair A & WP)**
- Significant cladding panel movement to western wall **(Repair C7)**
- Minor movement noted to south wall cladding panel from exterior **(Repair C5)**

**House Keeping Room**

- Spalling to south-west corner of floor adjacent to Gridline 7 wall and extending along length of precast panel P10-23 [12.7] **(Repair C11 & C5)**

**1205**

- Severe spalling to southern façade panel and adjacent areas of floor topping. Damage is only to façade panel and not to the structural panel. Butt joint between façade panel/structural. [12.8 & 12.9] **(Repair C6)**
- Spalling to south-west and south-east corners of floor adjacent to cladding panel **(Repair C11)**
- Note: fridge has moved out completely out of storage area due to high seismic motions [12.10] **(Repair N)**

**1206**

- Spalling of floor adjacent to structural panel with 500 x 600 area of spalled/drummy concrete, exposed reinforcing observed [12.11 & 12.12] **(Repair C11)**
- Butt joint between precast cladding panel and structural panel **(Repair C6)**



1207

- Spalling to floor adjacent to structural panel with 500 x 600 area of spalled/drummy concrete [12.11 similar & 12.12 similar] **(Repair C11)**
- Butt joint between precast cladding panel and structural panel **(Repair C6)**

1208

- Butt joint between façade panel and structural panel, notable outwards movement of façade panel [12.13] **(Repair C6)**
- Local spalling to floor adjacent to structural panel. Straight edge cut into floor for unknown reason [12.14] **(Repair C11)**

1209

- Local spalling to floor adjacent to structural panel [12.14 similar] **(Repair C11)**
- Notable movement of façade panel outwards **(Repair C6)**

1210

- Spalling to south-east corner of flooring [12.15] **(Repair C11)**
- Butt joint between façade panel/structural wall with solid mortar or concrete to full height of joint [12.16] **(Repair C6)**
- Minor spalling to floor in south-west corner **(Repair C11)**

1211

- Minor panel movement noted towards west [12.17] **(Repair C5)**
- Spalling to floor in north-east corner adjacent to structural panel [12.18] **(Repair C11)**

1212

- Linings and floor covering removed – no significant cracking or damaged concrete noted **(Repair A)**
- Notable cracking to exterior panel [12.19] **(Repair C6)**

1213

- Severe cracking to north-east corner of floor with approximately 10mm vertical displacement to cracked floor, existing timber formwork still in place [12.20 & 12.21] **(Repair C11)**
- Cracking to façade panel noted **(Repair C6)**

1214

- Linings removed to north-east corner – no obvious damage to floor noted **(Repair A)**
- No tolerance gap between façade panel and Gridline D structural wall in north-west corner [12.22] **(Repair C6)**
- Severe cracking to north-west corner of floor with vertical displacement [12.23] **(Repair C11)**
- Exposed reinforcing to Gridline D structural wall [12.24] **(Repair C8)**



**Level 13****1301**

- Movement to corner flashings of glass balustrade between 1301 & 1302 [13.1] **(Repair A)**
- Two broken glass panes to balustrade [13.2] **(Repair A)**
- Damage to precast panel below broken glass panes [13.3 & 13.4] **(Repair A)**
- Cracking to precast panel P13-33 [13.5] **(Repair C1 & C5)**
- Movement observed between precast panels P12-03 & P12-27B [13.6] **(Repair C7)**
- Spalling to concrete floor in north-west corner of room [13.7 similar] **(Repair C11 & WP)**

**1302**

- Spalling to concrete floor in south-west corner of room [13.7] **(Repair C11 & WP)**
- Water damage observed in south-west corner of room **(Repair A)**
- Tanking to exterior balcony has ripped [13.8] **(Repair WP)**
- Movement of precast panel P13-29 shown by tanking membrane [13.9] **(Repair C11)**
- Racking of door and linings in north/south direction [13.10] **(Repair A)**
- Cracking of tiles observed to bathroom area **(Repair A)**

**House Keeping Room 1316**

- Spalling to floor in southwest corner [12.7 similar] **(Repair C5 & C11)**

**1303**

- Window to Gridline D has smashed [13.11] **(Repair A)**
- Cracking of tiles observed **(Repair A)**
- Severe spalling to southern façade panel and adjacent areas of floor topping [12.8 & 12.9 similar] **(Repair C6)**
- Spalling to south-west and south-east corners of floor adjacent to cladding panel **(Repair C11)**

**1304 & 1305**

- Local spalling of floor to corner adjacent to structural panels **(Repair C11)**
- Butt joint between precast cladding panel and structural panel with notable cracking to exterior **(Repair C6)**

**1306**

- Seals to southern windows are typically beyond seismic clearance to Gridline 7 [13.12] **(Repair A)**
- Spalling to floor adjacent to structural panel in south-west corner [12.11 similar & 12.12 similar] **(Repair C11)**
- Butt joint between precast cladding panel and structural panel **(Repair C6)**

**1307**

- Local spalling of floor to corner adjacent to structural panel to south-west **(Repair C11)**
- Butt joint between precast cladding panel and structural panel **(Repair C6)**



1308

- Door misaligned and unable to be shut **(Repair A)**
- Southern window has clear gap to frame of 11mm at base to 1mm at top. [13.13] **(Repair A)**
- Local spalling of floor to corner adjacent to structural panel to south-east **(Repair C11)**
- Butt joint between precast cladding panel and structural panel **(Repair C6)**

1309

- Broken glass pane to bathroom door [13.14] **(Repair A)**
- Northern window has clear gap to frame of 5mm at base to 1mm at top. [13.15] **(Repair A)**
- Local spalling of floor to corner adjacent to structural panel to north-east **(Repair C11)**
- Butt joint between precast cladding panel and structural panel **(Repair C6)**

1310

- Local spalling of floor to corner adjacent to structural panel to north-west **(Repair C11)**
- Butt joint between precast cladding panel and structural panel **(Repair C6)**

1311

- Local spalling of floor to corner adjacent to structural panel to north-west **(Repair C11)**
- Butt joint between precast cladding panel and structural panel and notable cracking to façade panel **(Repair C6)**

1312

- Notable lining damage to grid D wall linings **(Repair A)**
- Butt joint between precast cladding panel and structural panel and notable cracking to façade panel **(Repair C6)**
- Local spalling of floor to north-west corner **(Repair C11)**

Corridor

- Eastern window has clear gap to frame of 11mm at base to 1mm at top. [13.17] **(Repair A)**

**Plant Room/Roof**Exterior

- Cap flashing to roof edge appears straight and undamaged [P.1] **(Repair N)**
- No obvious damage to external linings to plant room area [P.2] **(Repair N)**
- Roof cowls and associated fixings should be inspected by relevant subcontractor [P.2] **(Repair Services-1)**
- No obvious damage noted to external services. Specialist detailed inspection required [P.3] **(Repair Services-1)**
- Tanking to eastern end has notable bow in surface [P.4] **(Repair WP)**



Interior

- Inspection of connections of timber roof diaphragm and structural steelwork required **(Repair Steel-1 & Timber -1)**
- No obvious damage to plywood roofing or steel beam connections observed, further detailed inspection required **(Repair Timber-1)**
- Movement of services observed – detailed inspection required [P.5 & P.6] **(Repair Services-1)**
- Corrosion damage to proprietary brackets fixing mechanical units observed [P.7] **(Repair Services-1)**
- Minor cracking to Gib stopped fire walls **(Repair A)**

Exterior AHU Area

- Significant water to AHU area with lack of drainage **(Repair A)**
- No obvious movement to AHU – detailed inspection required **(Repair Services-1)**

Lift Machine Room

- Lift drive motor cabinets have fallen over [P.8] **(Repair Services-1)**
- Further detailed inspection of the lift shaft required **(Inspection LS-1)**
- No obvious damage to concrete/steel connections observed **(Repair N)**
- No damage observed to LMR hatch area **(Repair N)**
- Minor lining damage observed to walls **(Repair A)**

Stair 2

*Note: Stair 2 is the northern main stair to the building. The stair was surveyed/photographed from Level 13 to Basement and will be presented in this order.*

Level 13 to Level 12

- Lining damage around door and duct opening [LD.8 similar] **(Repair A)**
- Cracking/spalling to north-east corner plasterwork to joint between structural walls [S2.1] **(Repair C9)**
- Lining damage observed to southern wall [LD.6 similar] **(Repair A)**

Level 12 to Level 11

- Lining damage to western wall [S2.2] **(Repair A)**
- Lining damage to north-west corner behind riser [S2.3] **(Repair A)**
- Movement of drypack observed from underside of stair flight from Level 13 down to mid-height landing [S2.4] **(Repair A)**
- Spalling to underside of stair flight from Level 13 down to mid-height landing at northern wall [S2.5] **(Repair C4)**
- Cracking/spalling to north-east corner with concrete to joint between structural walls [S2.1 similar] **(Repair C9)**
- Cracking/spalling to north-east corner of mid-height landing [S2.6] **(Repair C12)**
- Cracking/spalling to underside of mid-height landing between Level 13 & 12 in north-east corner [S2.7] **(Repair C12)**
- Movement of drypack observed from underside of stair flight from mid-height landing down to Level 12 [S2.4 similar] **(Repair A)**
- Lining damage observed to southern wall [LD.6 similar] **(Repair A)**





Level 11 to Level 10

- Lining damage around door [LD.8 similar] **(Repair A)**
- Lining damage to western wall [S2.2 similar] **(Repair A)**
- Lining damage to north-west corner behind riser [S2.3 similar] **(Repair A)**
- Spalling to bottom of stair flight from mid-height landing down to Level 11 [S2.8] **(Repair C4)**
- Movement of drypack observed from underside of stair flight from Level 12 down to mid-height landing [S2.4 similar] **(Repair A)**
- Cracking/spalling to north-east corner with concrete to joint between structural walls [S2.1 similar] **(Repair C9)**
- Cracking/spalling to north-east corner of mid-height landing [S2.6 similar] **(Repair C12)**
- Cracking/spalling to underside of mid-height landing between Level 12 & 11 in north-east corner [S2.7 similar] **(Repair C12)**
- Movement of drypack observed from underside of stair flight from mid-height landing down to Level 11 [S2.4 similar] **(Repair A)**
- Lining damage observed to southern wall [LD.6 similar] **(Repair A)**

Level 10 to Level 9

- Lining damage around door [LD.8 similar] **(Repair A)**
- Lining damage to western wall [S2.2 similar] **(Repair A)**
- Lining damage to north-west corner behind riser [S2.3 similar] **(Repair A)**
- Hairline cracking to Level 10 floor at base of stair flight down from mid-height landing [S2.9] **(Repair C1)**
- Movement of drypack observed to stair flight from mid-height landing down to Level 10 [S2.10] **(Repair A)**
- Movement of drypack observed from underside of stair flight from Level 11 down to mid-height landing [S2.4 similar] **(Repair A)**
- Cracking/spalling to north-east corner with polystyrene to joint between structural walls [S2.1 similar] **(Repair C9)**
- Cracking/spalling to north-east corner of mid-height landing [S2.6 similar] **(Repair C12)**
- Cracking/spalling to underside of mid-height landing between Level 11 & 10 in north-east corner [S2.7 similar] **(Repair C12)**
- Movement of drypack observed from underside of stair flight from mid-height landing down to Level 10 [refer S2.10 also S2.4 similar] **(Repair A)**
- Lining damage in south-east corner **(Repair A)**
- Lining damage observed to southern wall [LD.6 similar] **(Repair A)**

Level 9 to Level 8

- Lining damage around door [LD.8 similar] **(Repair A)**
- Lining damage to western wall [S2.2 similar] **(Repair A)**
- Lining damage to north-west corner behind riser [S2.3 similar] **(Repair A)**
- Diagonal hairline crack raking from top left to bottom right on northern structural wall west of window [S2.11] **(Repair C1)**
- Hairline cracking to bottom western corner of window on northern structural wall [S2.12] **(Repair C1)**
- Hairline cracking to central portion of underside of Level 10 floor [S2.15 similar] **(Repair C1)**
- Movement of drypack observed to stair flight from mid-height landing down to Level 9 [S2.10 similar] **(Repair A)**
- Movement of drypack observed from underside of stair flight from Level 10 down to mid-height landing [S2.4 similar] **(Repair A)**



- Cracking/spalling to north-east corner with polystyrene to joint between structural walls [S2.1 similar] **(Repair C9)**
- Cracking/spalling to north-east corner of mid-height landing [S2.6 similar] **(Repair C12)**
- Spalling to northern edge of mid-height landing [S2.13] **(Repair C12)**
- Cracking/spalling to underside of mid-height landing between Level 10 & 9 in north-east corner [S2.7 similar] **(Repair C12)**
- Hairline cracking to underside of northern side of mid-height landing between Level 10 & 9 [S2.14] **(Repair C12)**
- Movement of drypack observed from underside of stair flight from mid-height landing down to Level 9 [S2.4 similar] **(Repair A)**
- Lining damage observed to southern wall [LD.6 similar] **(Repair A)**

#### Level 8 to Level 7

- Lining damage around door [LD.8 similar] **(Repair A)**
- Lining damage to western wall [S2.2 similar] **(Repair A)**
- Lining damage to north-west corner behind riser [S2.3 similar] **(Repair A)**
- Diagonal hairline crack raking from top left to bottom right on northern structural wall west of window [S2.11 similar] **(Repair C1)**
- Hairline cracking to bottom western corner of window on northern structural wall [S2.12 similar] **(Repair C1)**
- Hairline cracking to central portion of underside of Level 9 floor [S2.15] **(Repair C1)**
- Movement of drypack observed to stair flight from mid-height landing down to Level 8 [S2.10 similar] **(Repair A)**
- Movement of drypack observed from underside of stair flight from Level 9 down to mid-height landing [S2.4 similar] **(Repair A)**
- Hairline cracking to bottom eastern corner of window on northern structural wall [S2.16] **(Repair C1)**
- Cracking/spalling to north-east corner with concrete to joint between structural walls [S2.17] **(Repair C9)**
- Cracking/spalling to north-east corner of mid-height landing [S2.6 similar] **(Repair C12)**
- Cracking/spalling to underside of mid-height landing between Level 9 & 8 in north-east corner [S2.7 similar] **(Repair C12)**
- Movement of drypack observed to stair flight from Level 8 down to mid-height landing [S2.10 similar] **(Repair A)**
- Cracking/spalling to central portion of mid-height landing [S2.18] **(Repair C11)**
- Movement of drypack observed from underside of stair flight from mid-height landing down to Level 8 [S2.4 similar] **(Repair A)**
- Lining damage observed to southern wall [LD.6 similar] **(Repair A)**

#### Level 7 to Level 6

- Lining damage around door [LD.8 similar] **(Repair A)**
- Lining damage to western wall [S2.2 similar] **(Repair A)**
- Lining damage to north-west corner behind riser [S2.3 similar] **(Repair A)**
- Diagonal hairline crack raking from top left to bottom right on northern structural wall west of window [S2.11 similar] **(Repair C1)**
- Hairline cracking to top and bottom western corners of window on northern structural wall [S2.12 similar] **(Repair C1)**
- Hairline cracking to central portion of underside of Level 8 floor [S2.15 similar] **(Repair C1)**
- Movement of drypack observed to stair flight from mid-height landing down to Level 7 [S2.10 similar] **(Repair A)**



- Movement of drypack observed from underside of stair flight from Level 8 down to mid-height landing [S2.4 similar] **(Repair A)**
- Hairline cracking to underside of Level 8 floor at stair flight down to mid-height landing [S2.19] **(Repair C1)**
- Diagonal hairline crack raking from top left to bottom right on northern structural wall east of window [S2.11 similar] **(Repair C1)**
- Cracking/spalling to north-east corner with polystyrene to joint between structural walls [S2.17 similar] **(Repair C9)**
- Minor cracking/spalling to north-east corner of mid-height landing [S2.20] **(Repair C12)**
- Cracking/spalling to underside of mid-height landing between Level 8 & 7 in north-east corner [S2.7 similar] **(Repair C12)**
- Cracking to underside of northern side of mid-height landing between Level 8 & 7 [S2.21] **(Repair C11)**
- Movement of drypack observed to stair flight from Level 7 down to mid-height landing [S2.10 similar] **(Repair A)**
- Movement of drypack observed from underside of stair flight from mid-height landing down to Level 7 [S2.4 similar] **(Repair A)**
- Lining damage observed to southern wall [LD.6 similar] **(Repair A)**

#### Level 6 to Level 5

- Lining damage to western wall [S2.2 similar] **(Repair A)**
- Lining damage to north-west corner behind riser [S2.3 similar] **(Repair A)**
- Craze hairline cracking to northern structural wall west of window [S2.22] **(Repair C10)**
- Hairline cracking to top and bottom western corners of window on northern structural wall [S2.12 similar] **(Repair C10)**
- Hairline cracking to underside of Level 7 floor [S2.15 similar] **(Repair C1)**
- Movement of drypack observed to stair flight from mid-height landing down to Level 6 [S2.10 similar] **(Repair A)**
- Hairline cracking to bottom eastern corner of window on northern structural wall [S2.16 similar] **(Repair C10)**
- Movement of drypack observed from underside of stair flight from Level 7 down to mid-height landing [S2.4 similar] **(Repair A)**
- Cracking/spalling to north-east corner between structural walls [S2.23] **(Repair C9)**
- Minor cracking/spalling to north-east corner of mid-height landing [S2.20 similar] **(Repair C12)**
- Cracking/spalling to underside of mid-height landing between Level 7 & 6 in north-east corner [S2.23] **(Repair C12)**
- Cracking to underside of northern side of mid-height landing between Level 7 & 6 [S2.24] **(Repair C11 & C12)**
- Hairline horizontal crack to eastern wall above mid-height landing [S2.25] **(Repair C10)**
- Movement of drypack observed to stair flight from Level 6 down to mid-height landing [S2.10 similar] **(Repair A)**
- Movement of drypack observed from underside of stair flight from mid-height landing down to Level 6 [S2.4 similar] **(Repair A)**
- Cracking/spalling to south-west corner of mid-height landing at stair flight down to Level 5 [S2.26] **(Repair C3 & C4)**
- Lining damage observed to southern wall [LD.6 similar] **(Repair A)**



Level 5 to Level 4

- Lining damage around door [LD.8 similar] **(Repair A)**
- Lining damage to western wall [S2.2 similar] **(Repair A)**
- Lining damage to north-west corner behind riser [S2.3 similar] **(Repair A)**
- Craze hairline cracking to northern structural wall west of window [S2.22 similar] **(Repair C10 & Wall-1)**
- Hairline cracking to top and bottom western corners of window on northern structural wall [S2.12 similar] **(Repair C10 & Wall-1)**
- Hairline cracking to underside of Level 6 floor [S2.15 similar] **(Repair C1)**
- Movement of drypack observed to stair flight from mid-height landing down to Level 5 [S2.10 similar] **(Repair A)**
- Minor movement evident between stair flight and northern structural wall from Level 5 down to mid-height landing, no structural damage observed [S2.27] **(Repair N)**
- Movement of drypack observed from underside of stair flight from Level 6 down to mid-height landing [S2.4 similar] **(Repair A)**
- Cracking/spalling to north-east corner between structural walls [S2.23 similar] **(Repair C9)**
- Minor cracking/spalling to north-east corner of mid-height landing [S2.20 similar] **(Repair C12)**
- Cracking/spalling to underside of mid-height landing between Level 6 & 5 in north-east corner [S2.23 similar] **(Repair C12 & C11)**
- Cracking to underside of northern side of mid-height landing between Level 6 & 5 [S2.24 similar] **(Repair C12 & C11)**
- Horizontal hairline cracking and localized damage to northern structural wall above mid-height landing [S2.28] **(Repair C13, C10 & Wall-1)**
- Horizontal and diagonal hairline cracking to eastern wall above mid-height landing [S2.29] **(Repair C10 & Wall-1)**
- Lining damage observed to southern wall [LD.6 similar] **(Repair A)**

Level 4 to Level 3

- Minor lining damage above door **(Repair A)**
- Minor lining damage to western wall **(Repair A)**
- Lining damage to north-west corner behind riser [S2.3 similar] **(Repair A)**
- Craze hairline cracking to northern structural wall west of window [S2.22 similar] **(Repair C10 & Wall-1)**
- Hairline cracking to top and bottom western corners of window on northern structural wall [S2.12 similar] **(Repair C10 & Wall-1)**
- Hairline cracking to underside of Level 5 floor [S2.15 similar] **(Repair C1)**
- Movement of drypack observed to stair flight from mid-height landing down to Level 4 [S2.10 similar] **(Repair A)**
- Movement of drypack observed from underside of stair flight from Level 5 down to mid-height landing [S2.4 similar] **(Repair A)**
- Hairline cracking to bottom eastern corner of window on northern structural wall [S2.16 similar] **(Repair C10 & Wall-1)**
- Minor cracking/spalling to north-east corner between structural walls [S2.30] **(Repair C10)**
- Minor cracking/spalling to underside of mid-height landing between Level 4 & 5 in north-east corner [S2.30] **(Repair C13)**
- Craze hairline cracking to eastern end of northern structural wall above mid-height landing [S2.31] **(Repair C10)**
- Lining damage observed to southern wall [LD.6 similar] **(Repair A)**



Level 3 to Level 2

- Minor spalling to north-east corner of Level 3 floor at stair flight down to mid-height landing [S2.32] **(Repair C4)**
- Horizontal crack to eastern wall above mid-height landing [S2.33] **(Repair C1)**

Level 2 to Level 1

- Minor lining damage in north-west corner of Level 2 floor **(Repair A)**
- No evidence of movement to stair flight from mid-height landing down to Level 2 [S2.34] **(Repair N)**
- Hairline cracking to top and bottom western corners of window on northern structural wall [S2.12 similar] **(Repair C1)**
- Horizontal crack to eastern wall above mid-height landing [S2.33 similar] **(Repair C1)**
- Lining damage/movement in south-east corner above mid-height landing **(Repair A)**

Level 1 to Ground Floor

- Minor lining damage in north-west corner of Level 1 floor **(Repair A)**
- Hairline cracking to bottom western corner of window on northern structural wall [S2.12 similar] **(Repair C1)**
- Hairline cracking to bottom eastern corner of window on northern structural wall [S2.12 similar] **(Repair C1)**

Ground Floor to Basement

- Mould damage to southern wall at base of stair flight from mid-height landing down to Ground Floor [S2.35] **(Repair A)**
- Mould damage to western wall and egress corridor at Ground Floor [S2.36] **(Repair A)**
- Mould damage to southern wall at base of stair flight from mid-height landing down to Basement [S2.35 similar] **(Repair A)**

**Stair 3**

*Note: Stair 3 is the north-east secondary stair to the building. The stair was surveyed/photographed from Level 13 to Ground Floor and will be presented in this order.*

Level 13 to Level 12

- Spalling to precast panels at weldplate locations on eastern wall at stair flight down to mid-height landing [S3.1] **(Repair C14)**
- Evidence of movement around weldplates in north-east corner above mid-height landing [S3.2] **(Repair C1)**

Level 12 to Level 11

- Spalling to precast panels at weldplate locations on eastern wall at stair flight down to mid-height landing [S3.3] **(Repair C14, note detailed inspection required to this weldplate)**
- Mortar packing to vertical joint between precast panels [S3.3] **(Repair C5)**



Level 11 to Level 10

- Spalling to precast panels at weldplate locations on eastern wall at stair flight down to mid-height landing [S3.1 similar] **(Repair C14)**

Level 10 to Level 9

- Spalling to precast panels at weldplate locations on eastern wall at stair flight down to mid-height landing [S3.3 similar] **(Repair C14)**
- Spalling to precast panels at weldplates in north-east corner above mid-height landing [S3.4] **(Repair C14)**
- Hairline cracking to northern panel above mid-height landing **(Repair C1)**
- Notable spalling of drypack mortar to bottom of stair flight from Level 10 to mid-height landing **(Repair A)**

Level 9 to Level 8

- Spalling to precast panels at weldplate locations on eastern wall at stair flight down to mid-height landing [S3.5] **(Repair C14)**
- Spalling to precast panels at weldplates in north-east corner above mid-height landing [S3.4 similar] **(Repair C14)**

Level 8 to Level 7

- Spalling to precast panels at weldplate locations on eastern wall at stair flight down to mid-height landing [S3.3 similar] **(Repair C14)**
- Minor spalling and hairline crack to horizontal joint between precast panels on eastern wall [S3.6] **(Repair C1 & C4)**
- Spalling of drypack to bottom of stair flight from Level 8 to mid-height landing **(Repair A)**

Level 7 to Level 6

- Spalling to precast panels at weldplate locations on eastern wall at stair flight down to mid-height landing [S3.3 similar] **(Repair C14)**
- Pre-existing exposed reinforcing to underside of stair flight from Level 8 to mid-height landing [S3.7] **(Repair C4)**
- Movement of drypack observed from underside of stair flight from Level 8 down to mid-height landing [S3.8] **(Repair A)**
- Spalling to precast panels at weldplates in north-east corner above mid-height landing, with notable moisture around this joint [S3.9] **(Repair C14)**
- Spalling of drypack to bottom of stair flight from Level 7 to mid-height landing **(Repair A)**

Level 6 to Level 5

- Spalling to precast panels at weldplate locations on eastern wall at stair flight down to mid-height landing, drypack mortar to joint [S3.10] **(Repair C14 & C5)**
- Spalling to precast panels at weldplates in north-east corner above mid-height landing [S3.9 similar] **(Repair C14)**
- Spalling of drypack to bottom of stair flight from Level 6 to mid-height landing **(Repair A)**



Level 5 to Level 4

- Movement of drypack observed to stair flight from mid-height landing down to Level 5 [S3.11] **(Repair A)**
- Spalling to precast panels at weldplate locations on eastern wall at stair flight down to mid-height landing [S3.10 similar] **(Repair C14)**
- Evidence of movement around weldplates in north-east corner above mid-height landing [S3.2 similar] **(Repair C14)**
- Spalling of drypack to bottom of stair flight from Level 5 to mid-height landing **(Repair A)**

Level 4 to Level 3

- Minor cracking/spalling to bottom of precast panels on eastern wall [S3.12] **(Repair C1 & C4)**
- Minor cracking/spalling to bottom of precast panel in north-east corner above mid-height landing [S3.13] **(Repair C1 & C4)**

Level 3 to Level 2

- Hairline cracking at base of precast panel joint on northern wall above mid-height landing [S3.14] **(Repair C1 & C4)**

Level 2 to Level 1 and Level 1 to Ground Floor

- No apparent structural issues observed **(Repair N)**

**Exterior****Eastern Elevation (Gridline G)**

*Note: The lower portion of the eastern elevation could not be viewed safely during the times of inspections due to hazards from adjacent buildings. Further inspection may be required following closer external viewing.*

- Eastern elevation reference photo [EE.1] **(Repair N)**

Level 12

- Minor hairline cracking at junction of panels P12-14B, P12-14A, P11-14B & P10-14A [EE.2] **(Repair C14 & C1)**

Level 11

- Minor hairline cracking at junction of panels P11-14B, P10-14A & P10-14B [EE.3] **(Repair C14 & C1)**

Level 10

- Minor hairline cracking and movement observed at junction of panels P10-14B, P10-14A, P09-14B & P08-14A [EE.4] **(Repair C14 & C1)**





Level 8

- Minor hairline cracking and spalling observed at junction of panels P08-14B, P08-14A, P07-14B & P06-14A [EE.5] **(Repair C14 & C1)**

Level 4

- Minor hairline cracking to 300 thick structural wall at Level 4 [EE.6] **(Repair C10)**

**Northern Elevation (Gridlines 1 & 2)**

*Note: a portion of the lower western end of the northern elevation is unable to be observed due to an existing adjacent building. Further detailed exterior inspection is required once the adjacent building is demolished.*

- Northern elevation reference photo [EN.1] **(Repair N)**

Level 13

- No apparent structural issues observed **(Repair N)**

Level 12

- Spalling to top eastern corner of panel P11-08 and notable cracking [EN.2] **(Repair C6)**
- Movement to western ends of panels P12-08 & P-11-08 [EN.3] **(Repair C6)**

Level 11

- Movement and significant spalling evident to top of panel P10-08 [EN.4] **(Repair C6)**
- Spalling and diagonal crack to central portion of panel P10-08 [EN.4] **(Repair C6)**
- Hairline cracking to bottom eastern end of panel P11-08 [EN.4] **(Repair C6)**

Level 10

- Movement/spalling evident to western end of panel P09-08 [EN.5] **(Repair C6)**
- Spalling and diagonal crack to central portion of panel P09-08 [EN.6] **(Repair C6)**
- Cracking to bottom eastern end of panel P10-08 [EN.6] **(Repair C6)**
- Hairline cracking to bottom central portion of panel P10-10 [EN.7] **(Repair C4)**

Level 9

- Hairline cracking to bottom eastern end of panel P09-08 [EN.8] **(Repair C6)**
- Movement to eastern ends of panels P09-10 & P-08-10 [EN.9] **(Repair C6)**
- Minor spalling to top eastern corner of panel P08-08 [EN.10] **(Repair C6)**
- Movement to western end of panel P08-08 [EN.11] **(Repair C6)**
- Minor spalling to eastern end of structural wall at Level 9 [EN.11] **(Repair C4)**





Level 8

- Hairline cracking and minor spalling to bottom eastern end of panel P08-08 [EN.12] **(Repair C6)**
- Movement to western end of panel P07-08 [EN.13] **(Repair C6)**
- Minor spalling to eastern end of structural wall at Level 8 [EN.13] **(Repair C4)**
- Spalling and diagonal crack to central portion panel P07-08 [EN.14] **(Repair C6)**

Level 7

- Movement/spalling evident to western ends of panels P07-08 & P06-08 [EN.15] **(Repair C6)**
- Minor spalling to central portion of panel P-06-08 [EN.15] **(Repair C6)**

Level 6

- Movement/spalling evident to western ends of panels P06-08 & P05-08 [EN.16] **(Repair C6)**
- Minor spalling to eastern end of structural wall at Level 6 [EN.16] **(Repair C4 & C1)**
- Spalling and diagonal crack to central portion of panel P05-08 [EN.17] **(Repair C6)**
- Hairline cracking to bottom eastern end of panel P06-08 [EN.18] **(Repair C6)**
- Significant cracking to top eastern end of panel P05-08 [EN.18] **(Repair C6)**

Level 5

- Significant cracking to bottom eastern end of panel P05-10 with butt joint to structural panel [EN.19] **(Repair C6)**
- Hairline cracking to top eastern end of panel P04-10, notable spalling to corner with butt joint to structural panel [EN.19] **(Repair C6)**
- Significant cracking to bottom eastern end of panel P05-08 [EN.20] **(Repair C6)**
- Significant cracking to top eastern end of panel P04-08 and local spalling [EN.20] **(Repair C6)**
- Significant spalling to top western end of central portion of panel P04-08 [EN.21] **(Repair C6)**

Level 4

- Numerous cracks to bottom eastern end of panel P04-08 [EN.22] **(Repair C6)**
- Cracking to top eastern end of panel P03-08 [EN.22] **(Repair C6)**
- Significant cracking to bottom eastern end of panel P04-10 [EN.23] **(Repair C6)**
- Cracking to top eastern end of panel P03-10 [EN.23] **(Repair C6)**
- Spalling to panel P03-11 at Level 4 [EN.23] **(Repair C4)**

Level 3

- Cracking to bottom eastern end of panel P03-10 [EN.24] **(Repair C6)**
- Spalling to insitu joint between panels P02-11 & P02-10 at Level 3 [EN.24 & EN.25] **(Repair C4)**
- Cracking to bottom western end of panel P03-10 [EN.25] **(Repair C6)**
- Spalling/cracking to bottom central portion of panel P03-08 [EN.26] **(Repair C6)**
- Spalling to top western corner of panel P02-09 [EN.26] **(Repair C4)**
- Spalling to insitu joint between panels P02-09 & P01-08 at Level 3 [EN.26] **(Repair C4)**



Level 2

- No apparent structural issues observed **(Repair N)**

Level 1

- No apparent structural issues observed **(Repair N)**

Ground Floor

- No apparent structural issues observed **(Repair N)**

**Western Elevation (Gridlines A & B)**

- Western Elevation lower building reference photo [EW.1]
- Western Elevation tower reference photo [EW.2]

Ground Floor – Level 4

- Cracking to plasterwork central on Level 2 [EW.3] **(Repair A)**
- Cracking to plasterwork Level 2 window jamb [EW.4] **(Repair A)**
- Cracking to plasterwork to southern Ground Floor column [EW.5] **(Repair A)**
- Cracking to plasterwork to three central Ground Floor columns [EW.6 typical photo] **(Repair A)**
- Minor cracking and damage to plasterwork observed to elevation **(Repair A)**

Level 4

- Loss of drypack and movement to base of southern pier of panel P04-26 [EW.7] **(Repair C7)**
- Loss of drypack and movement to base of central pier of panel P04-26 [EW.8] **(Repair C7)**
- Spalling and movement to base of northern pier of panel P04-26 [EW.9] **(Repair C7)**
- Cracking and movement to base of southern pier of panel P04-27A [EW.9] **(Repair C7)**
- Spalling and movement to base of northern pier of panel P04-27A [EW.10] **(Repair C7)**
- Spalling and movement to base of southern pier of panel P04-27B [EW.10] **(Repair C7)**

Level 5

- Spalling to top northern corner of panel P04-27B [EW.11] **(Repair C7)**
- Hairline cracking to top northern corner of panel P04-27B [EW.11] **(Repair C7)**
- Hairline cracking to bottom northern corner of panel P05-27B [EW.11] **(Repair C7)**
- Cracking/spalling movement evident to junction of panels P04-27A, P04-27B, P05-27A & P05-27B [EW.12] **(Repair C7)**
- Loss of drypack and outwards movement to panel P05-26 at central joint [EW.13] **(Repair C7)**
- Cracking/spalling of panel P05-26 at central pier and evidence of outwards movement [EW.14] **(Repair C7)**
- Cracking/spalling of panel P05-26 at southern pier and evidence of outwards movement [EW.15] **(Repair C7)**
- Cracking to panel P04-26 at southern pier [EW.15] **(Repair C7)**



Level 6

- Cracking/spalling of panel P06-26 at southern pier and evidence of outwards movement [EW.16] **(Repair C7)**
- Cracking to panel P05-26 at southern pier [EW.16] **(Repair C7)**
- Cracking of panel P06-26 at central pier and evidence of outwards movement [EW.17] **(Repair C7)**
- Outwards movement to panel P06-26 at central joint [EW.18] **(Repair C7)**
- Hairline cracking to panel P06-27A at central joint [EW.18] **(Repair C7)**
- Cracking/spalling movement evident to junction of panels P05-27A, P05-27B, P06-27A & P06-27B [EW.19] **(Repair C7)**
- Spalling to bottom northern corner of panel P06-27B [EW.20] **(Repair C7)**
- Hairline cracking to top northern corner of panel P05-27B [EW.20] **(Repair C7)**
- Hairline cracking to bottom northern corner of panel P06-27B [EW.20] **(Repair C7)**

Level 7

- Spalling to bottom northern corner of panel P07-27B [EW.21] **(Repair C7)**
- Spalling to top northern corner of panel P06-27B [EW.21] **(Repair C7)**
- Hairline cracking to top northern corner of panel P06-27B [EW.21] **(Repair C7)**
- Cracking/spalling movement evident to junction of panels P06-27A, P06-27B, P07-27A & P07-27B [EW.22] **(Repair C7)**
- Outwards movement to panel P07-27A & P07-26 at central joint [EW.23] **(Repair C7)**
- Hairline cracking to panels P06-27A, P06-26, P07-27A & P-07-26 at central joint [EW.23] **(Repair C7)**
- Hairline cracking of panel P07-26 at central pier and evidence of outwards movement [EW.24] **(Repair C7)**
- Hairline cracking of panel P06-26 at central pier [EW.24] **(Repair C7)**
- Cracking/spalling of panel P07-26 at southern pier and evidence of outwards movement [EW.25] **(Repair C7)**
- Cracking to panel P06-26 at southern pier [EW.25] **(Repair C7)**

Level 8

- Cracking/spalling of panel P08-26 at southern pier and evidence of outwards movement [EW.26] **(Repair C7)**
- Cracking/spalling of panel P07-26 at southern pier [EW.26] **(Repair C7)**
- Hairline cracking of panel P08-26 at central pier and evidence of outwards movement [EW.27] **(Repair C7)**
- Hairline cracking of panel P07-26 at central pier [EW.27] **(Repair C7)**
- Cracking/spalling movement evident to junction of panels P07-27A, P07-26, P08-27A & P08-26 [EW.28] **(Repair C7)**
- Cracking/movement evident to junction of panels P07-27A, P07-27B, P08-27A & P08-27B [EW.29] **(Repair C7)**
- Spalling/hairline cracking to top northern corner of panel P07-27B [EW.30] **(Repair C7)**
- Spalling/hairline cracking to bottom northern corner of panel P08-27B [EW.30] **(Repair C7)**



Level 9

- Spalling/movement to south-west corner at House Keeping Room observed full height of tower. Typical photo shows damage from Level 8 to Level 9 [EW.31] **(Repair C5 & C4)**
- Hairline cracking to top northern corner of panel P08-27B [EW.32] **(Repair C7)**
- Spalling/hairline cracking to bottom northern corner of panel P09-27B [EW.32] **(Repair C7)**
- Cracking/spalling movement evident to junction of panels P08-27A, P08-27B, P09-27A & P09-27B [EW.33] **(Repair C7)**
- Minor spalling and evidence of movement to bottom northern corner of panel P09-26 [EW.34] **(Repair C7)**
- Evidence of outward movement at central pier of panel P09-26 [EW.35] **(Repair C7)**
- Spalling of panel P09-26 at southern pier and evidence of outwards movement [EW.36] **(Repair C7)**
- Hairline cracking of panel P08-26 at southern pier [EW.36] **(Repair C7)**

Level 10

- Spalling of panel P10-26 at southern pier and evidence of outwards movement [EW.37] **(Repair C7)**
- Hairline cracking of panel P09-26 at southern pier [EW.37] **(Repair C7)**
- Hairline cracking and evidence of outward movement at central pier of panel P10-26 [EW.38] **(Repair C7)**
- Hairline cracking of panels P09-26 & P08-27A at central joint [EW.39] **(Repair C7)**
- Evidence of outward movement at central joint of panel P09-26 [EW.39] **(Repair C7)**
- Cracking/spalling movement evident to junction of panels P09-27A, P09-27B, P10-27A & P10-27B [EW.40] **(Repair C7)**
- Cracking to bottom northern corner of panel P10-27B [EW.41] **(Repair C7)**

Level 11

- Evidence of outward movement to bottom northern corner of panel P11-27A [EW.42] **(Repair C7)**
- Evidence of outward movement of panels P11-27A & P11-26 at central joint [EW.43] **(Repair C7)**
- Hairline cracking and evidence of outward movement at central pier of panel P11-26 [EW.44] **(Repair C7)**
- Spalling of panel P11-26 at southern pier and evidence of outwards movement [EW.45] **(Repair C7)**

Level 12

- Spalling of panel P12-26 at southern pier and evidence of outwards movement [EW.46] **(Repair C7)**
- Evidence of outward movement at central pier of panel P12-26 [EW.47] **(Repair C7)**
- Evidence of outward movement of panels P12-27A & P12-26 at central joint [EW.48] **(Repair C7)**
- Evidence of outward movement to bottom northern corner of panel P12-27A [EW.49] **(Repair C7)**



Level 13

- Hairline cracking to top southern corner of opening to panel P12-27B [EW.50] **(Repair C7 & A)**
- Cracking to capping rendering full extent of western elevation [EW.50] **(Repair A)**
- Note: refer also Level 13 notes for Rooms 1301 & 1302

**Southern Elevation (Gridlines 6 & 7)**

*Note: a lower portion of the southern elevation is unable to be observed safely due to the existing adjacent building. Further inspection is required following demolition/securing of the adjacent building.*

- Southern elevation reference photo [ES.1] **(Repair N)**

Level 13

- External glazing damage [ES.2] **(Repair A)**
- Spalling/cracking to panel P13-21 [ES.3] **(Repair C6)**
- Spalling/cracking to panel P11-16 at Level 13 [ES.4] **(Repair C6)**

Level 12

- Movement/spalling evident to western end of panel P12-21 [ES.5] **(Repair C6)**
- Spalling to eastern end of panel P10-18 at Level 12 [ES.6] **(Repair C6)**
- Spalling to top eastern corner of panel P11-17 [ES.7] **(Repair C6)**

Level 11

- Severe spalling/damage to panel P11-21 [ES.8] **(Repair C6)**
- Spalling to eastern end of structural wall [ES.8] **(Repair C4)**
- Spalling to western end of panel P10-20 [ES.8] **(Repair C4)**
- Spalling/cracking to bottom western corner of panel P11-19 [ES.9] **(Repair C6)**
- Severe spalling/damage to top western corner of panel P10-19 [ES.9] **(Repair C6)**
- Spalling to eastern end of panel P10-20 [ES.9] **(Repair C4)**
- Minor spalling to top eastern corner of panel P10-19 [ES.10] **(Repair C6)**
- Spalling to eastern end of panel P10-18 [ES.10] **(Repair C4)**
- Spalling/cracking to bottom western corner of panel P11-17 [ES.10] **(Repair C6)**
- Severe spalling/damage to top western corner of panel P10-17 [ES.10] **(Repair C6)**
- Spalling/cracking to top eastern corner of panel P10-17 [ES.11] **(Repair C6)**

Level 10

- Spalling/movement to panel P10-21 [ES.12] **(Repair C6)**
- Minor spalling to eastern end of structural wall [ES.12] **(Repair C4)**
- Minor spalling to western end of panel P10-20 [ES.12] **(Repair C4)**
- Minor spalling to western end of panel P08-20 [ES.12] **(Repair C4)**
- Minor spalling to eastern end of panel P10-18 [ES.13] **(Repair C4)**
- Spalling/cracking to bottom western corner of panel P10-17 [ES.13] **(Repair C6)**
- Severe spalling/damage to top western corner of panel P09-17 [ES.13] **(Repair C6)**
- Cracking to bottom eastern corner of panel P10-17 [ES.14] **(Repair C6)**
- Cracking to top eastern corner of panel P09-17 [ES.14] **(Repair C6)**
- Minor spalling to western end of panel P09-16 [ES.14] **(Repair C4)**



Level 9

- Cracking and spalling to top eastern corner of panel P08-17 [ES.15] **(Repair C6)**
- Cracking and spalling to top eastern corner of panel P08-19 [ES.16] **(Repair C6)**

Level 8

- Minor damage to panels and structural wall to eastern elevation observed full height in south-east corner [ES.17] **(Repair C5)**
- Cracking to bottom eastern corner of panel P08-17 [ES.18] **(Repair C6)**
- Cracking to top eastern corner of panel P07-17 [ES.18] **(Repair C6)**
- Minor spalling to western end of panel P07-16 [ES.18] **(Repair C4)**
- Minor spalling to eastern end of panel P08-20 [ES.19] **(Repair C4)**
- Minor spalling to eastern end of panel P06-20 [ES.19] **(Repair C4)**
- Spalling/movement to panel P08-21 [ES.20] **(Repair C6)**

Level 7

- Minor spalling of eastern structural wall in south-east corner [ES.21] **(Repair C4)**
- Spalling to eastern end of panel P05-16 [ES.22] **(Repair C4)**

Level 6

- Spalling to eastern end of panel P06-21 [ES.23] **(Repair C6)**
- Spalling to eastern end of panel P06-20 [ES.23] **(Repair C4)**
- Spalling to eastern end of panel P03-20 [ES.23] **(Repair C4)**
- Cracking to bottom western corner of panel P06-19 [ES.23] **(Repair C6)**
- Severe spalling/damage to top western corner of panel P05-19 [ES.23] **(Repair C6)**
- Cracking to bottom eastern corner of panel P06-19 [ES.24] **(Repair C6)**
- Spalling/cracking to top eastern corner of panel P05-19 [ES.24] **(Repair C6)**
- Spalling to western end of panel P03-18 [ES.24] **(Repair C4)**
- Severe spalling/damage to top western corner of panel P05-17 [ES.25] **(Repair C6)**
- Hairline cracking to bottom western corner of panel P06-17 [ES.25] **(Repair C1)**
- Reference photo of all Level 6 damage observed [ES.26]

Level 5

- Spalling to top eastern corner of panel P04-19 [ES.27] **(Repair C6)**

Level 4

- Significant cracking to structural wall between Level 5 & 4 [ES.28] **(Repair C10 & Wall-1)**
- Minor spalling to top western corner of panel P03-19 [ES.29] **(Repair C5 & C4)**
- Minor spalling to eastern end of panel P03-20 [ES.29] **(Repair C4)**
- Cracking to top eastern corner of panel P03-17 [ES.30] **(Repair C5 & C4)**

Level 3

- Minor spalling to eastern end of structural wall at Level 3 [ES.31] **(Repair C4)**
- No other apparent structural issues observed [ES.32] **(Repair N)**



Level 2

- Unable to view safely due to damaged adjacent building

Level 1

- Unable to view safely due to damaged adjacent building

Ground Floor

- Unable to view safely due to damaged adjacent building

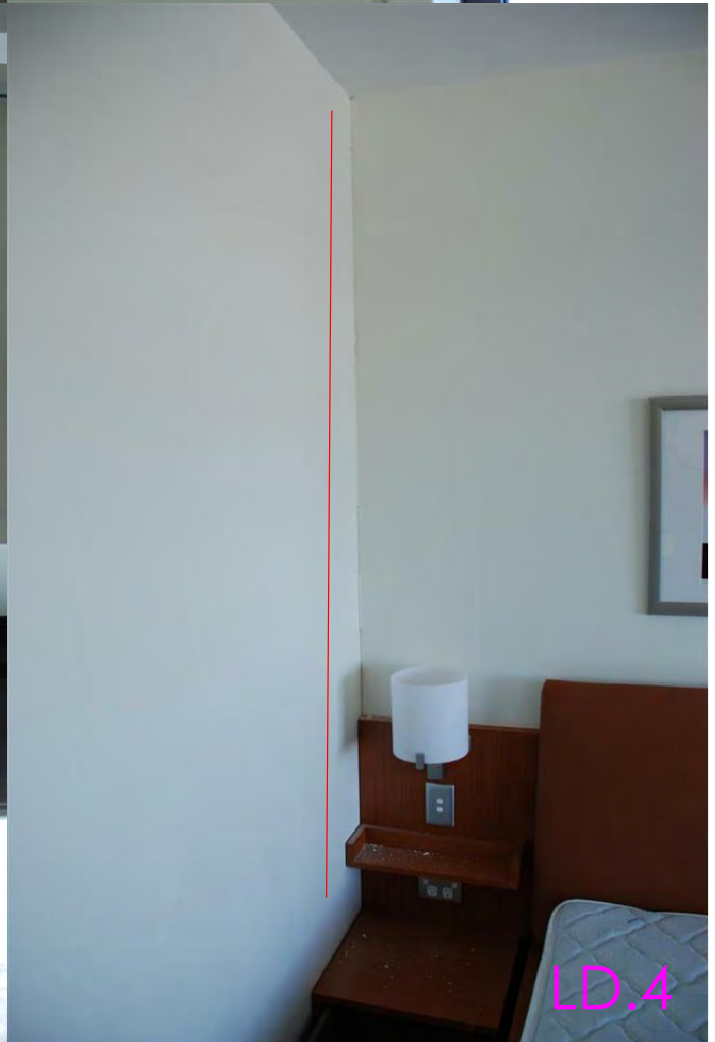
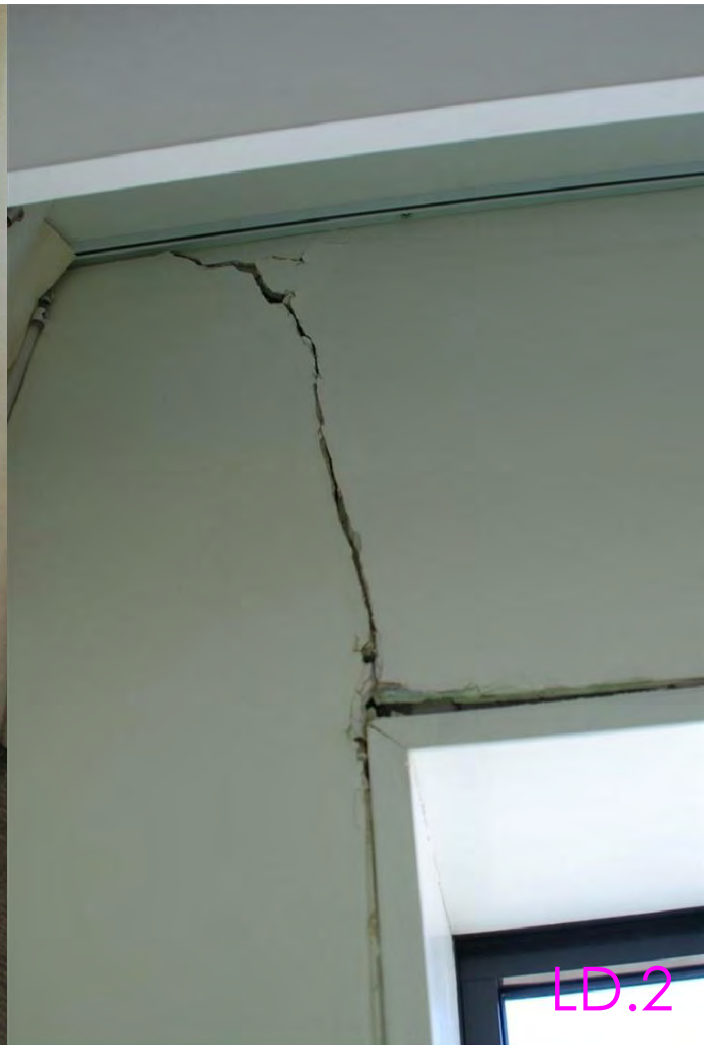


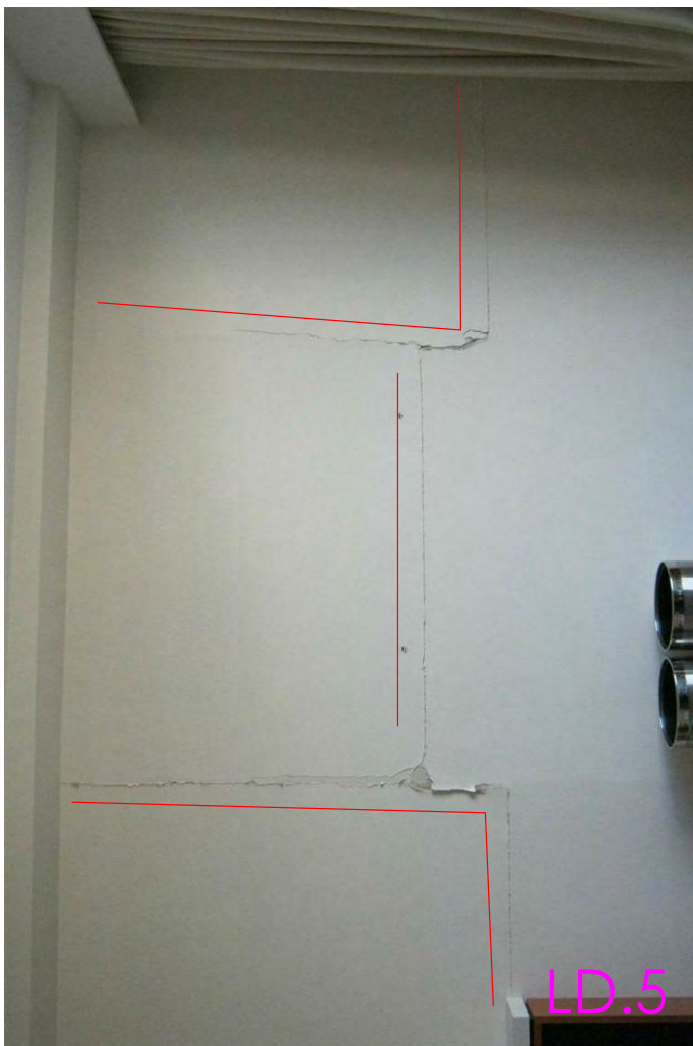
# APPENDIX D

## Photographs





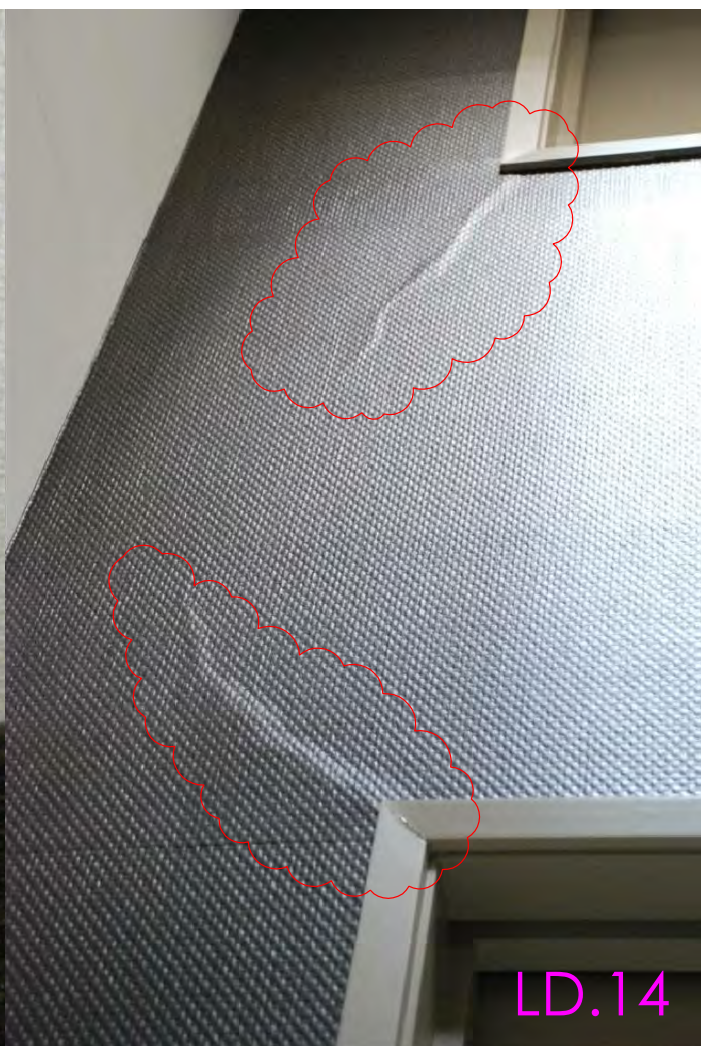
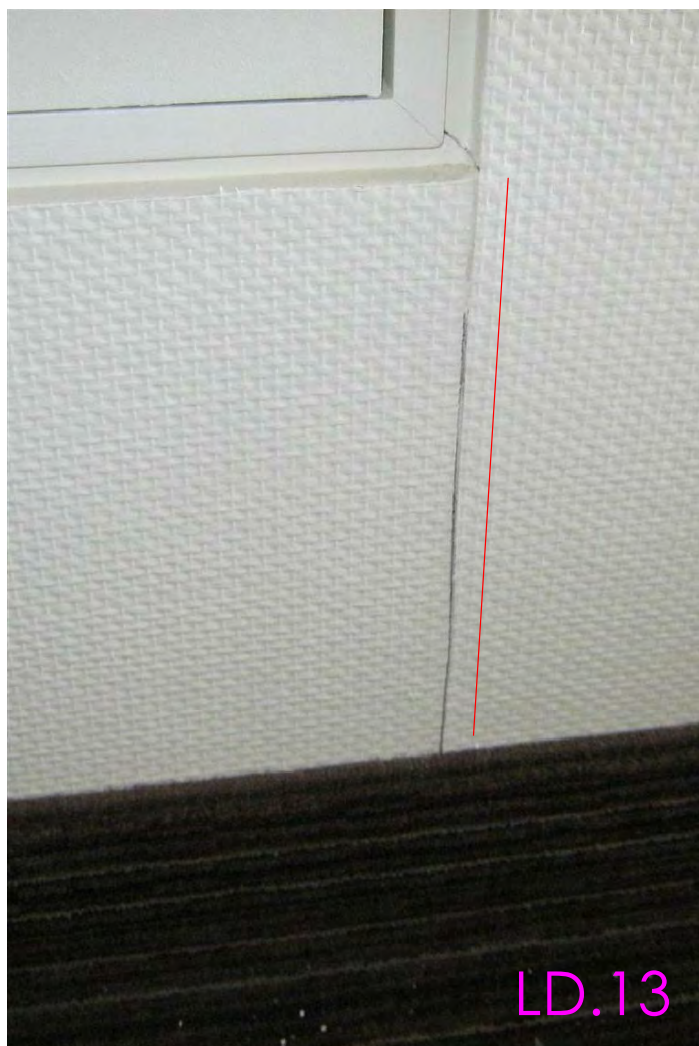








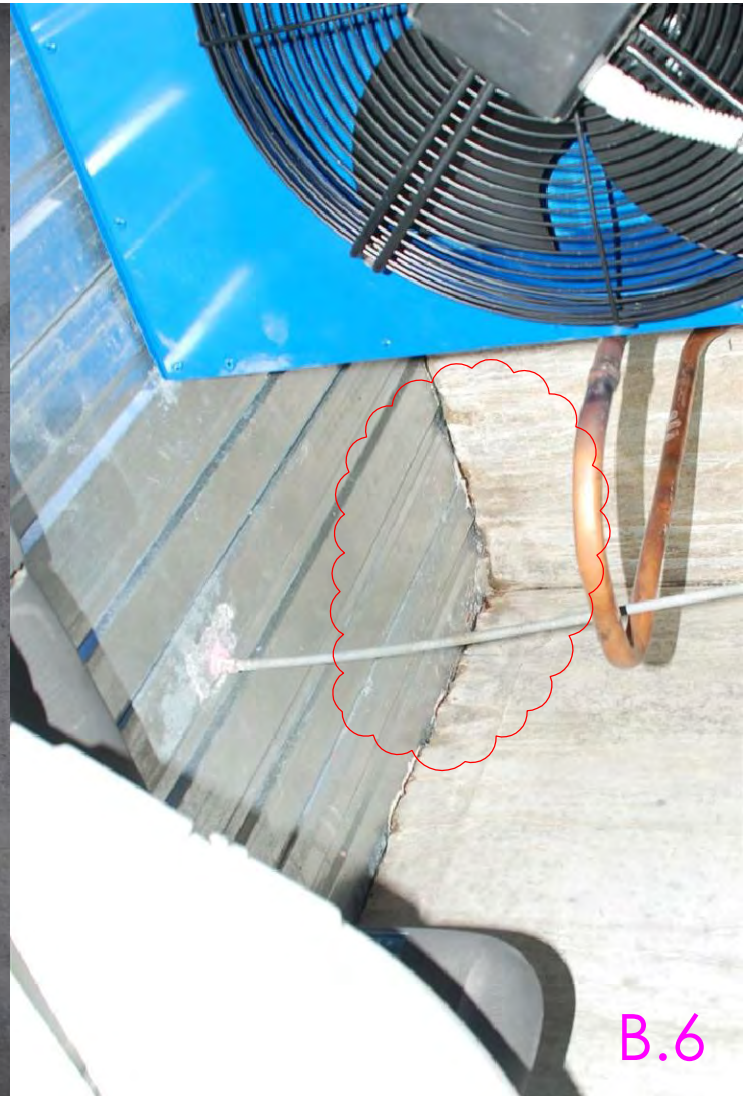










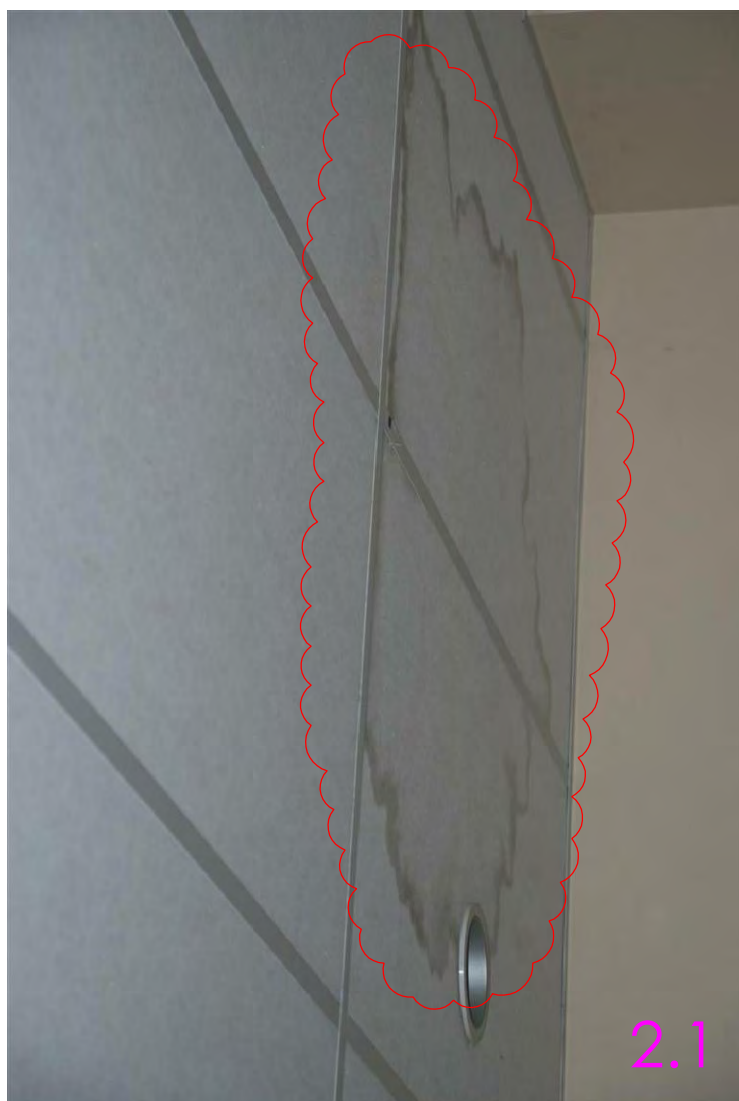
















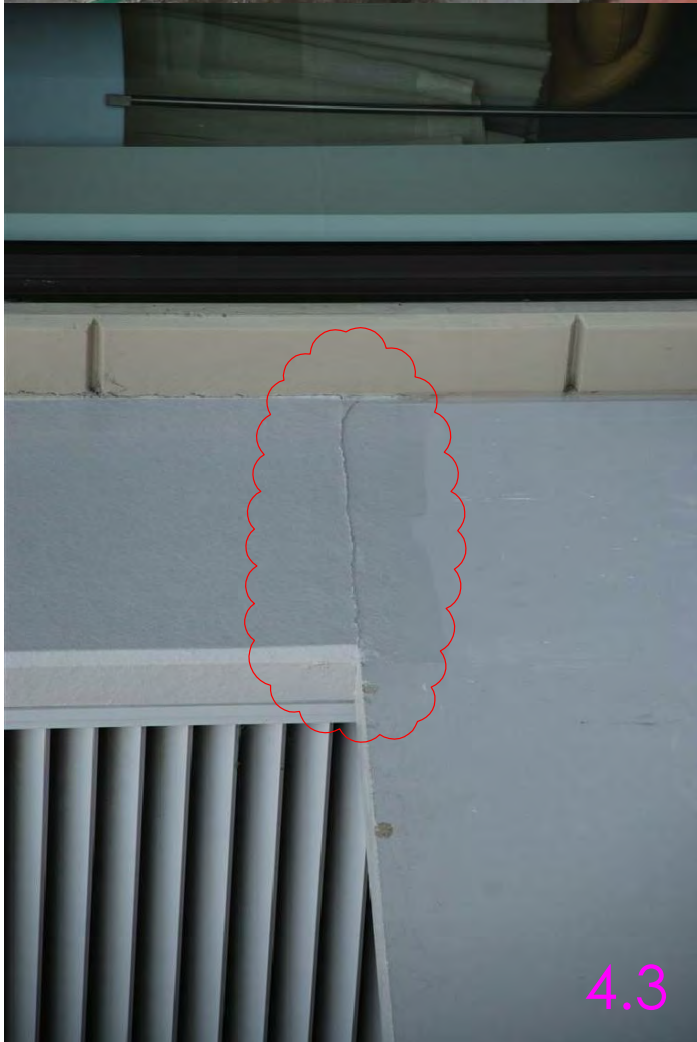












































6.5



6.6



6.7



6.8

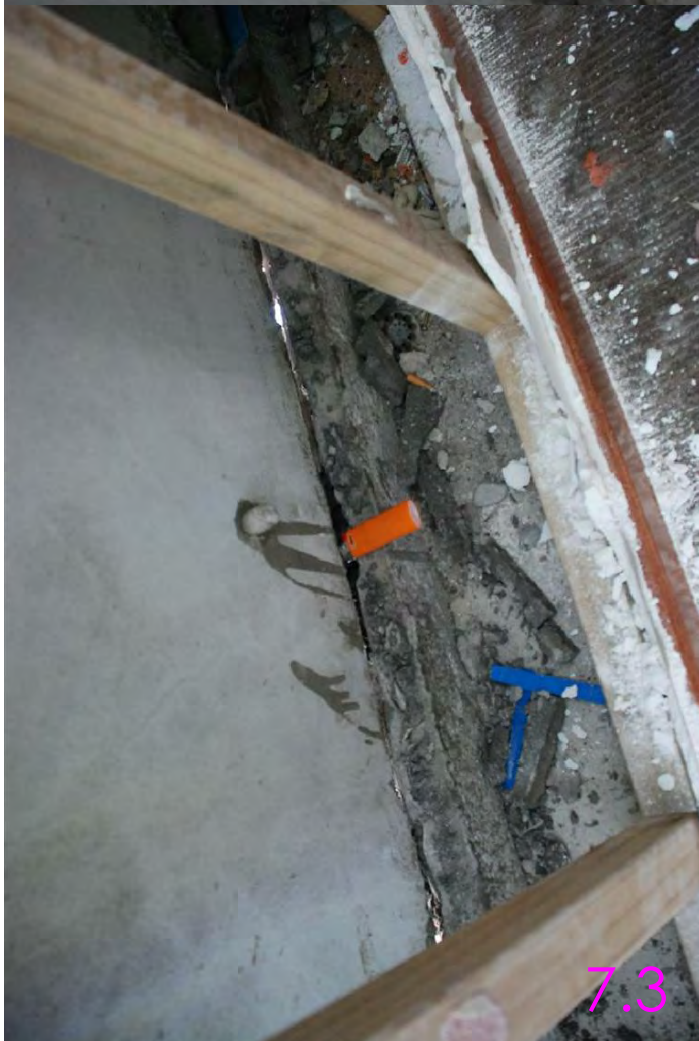
















7.5



7.6



7.7



7.8

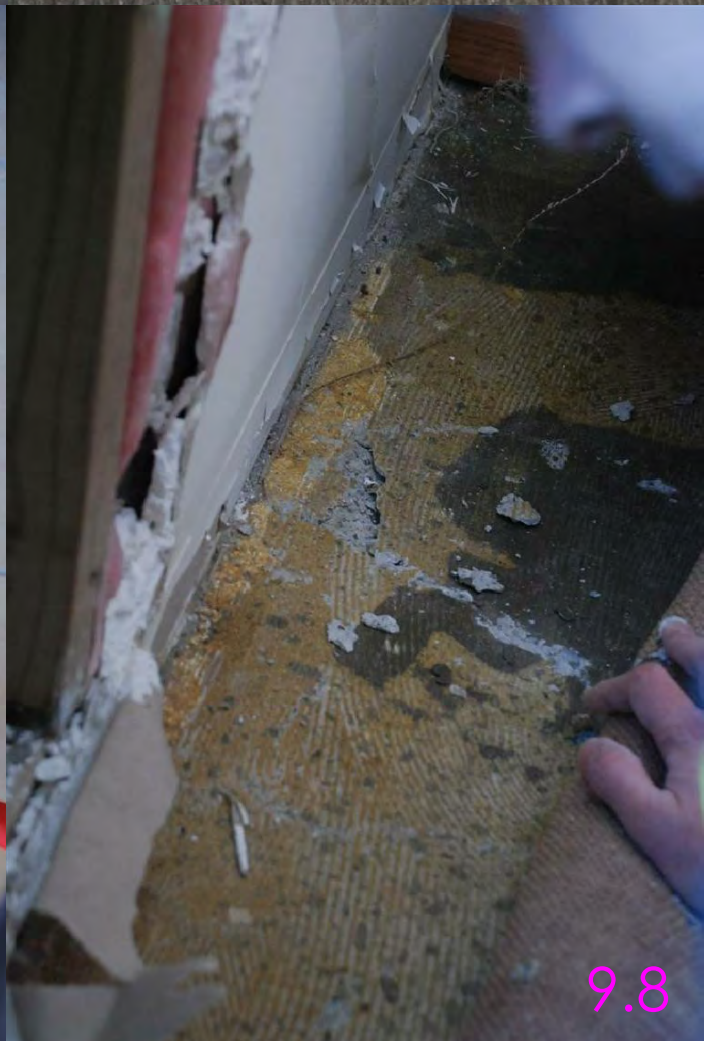
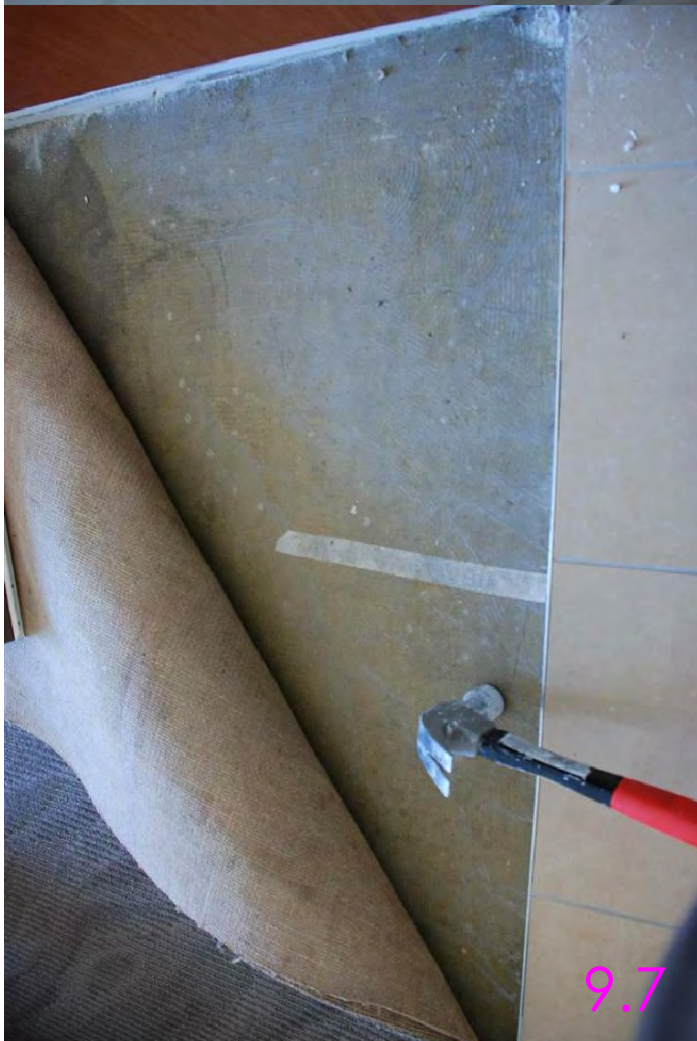








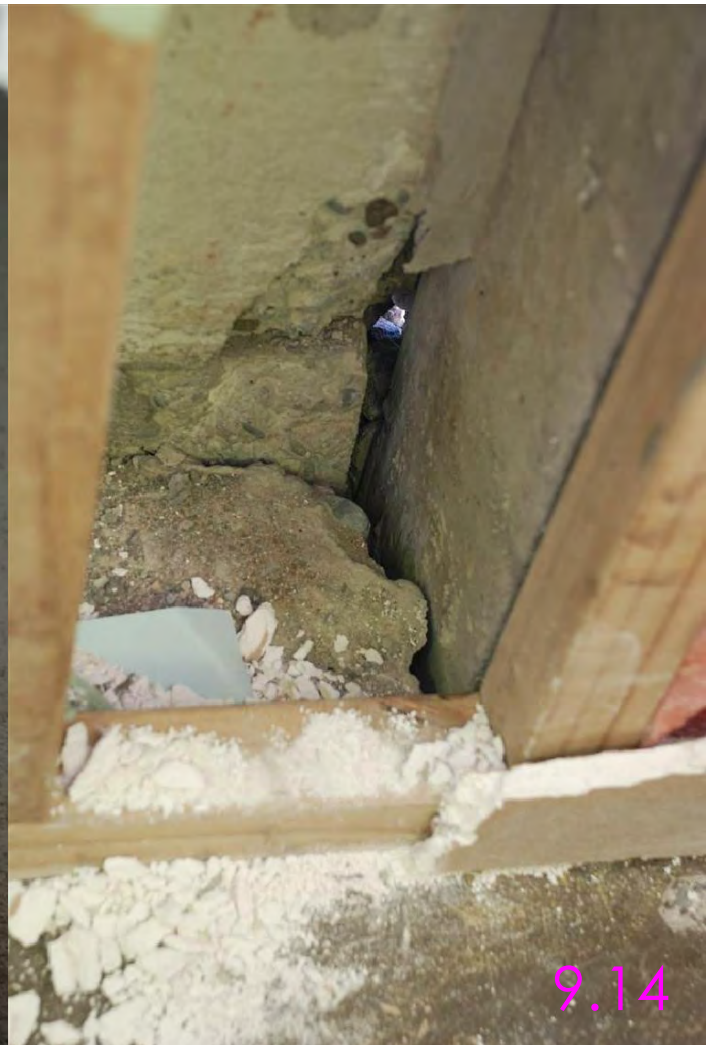
















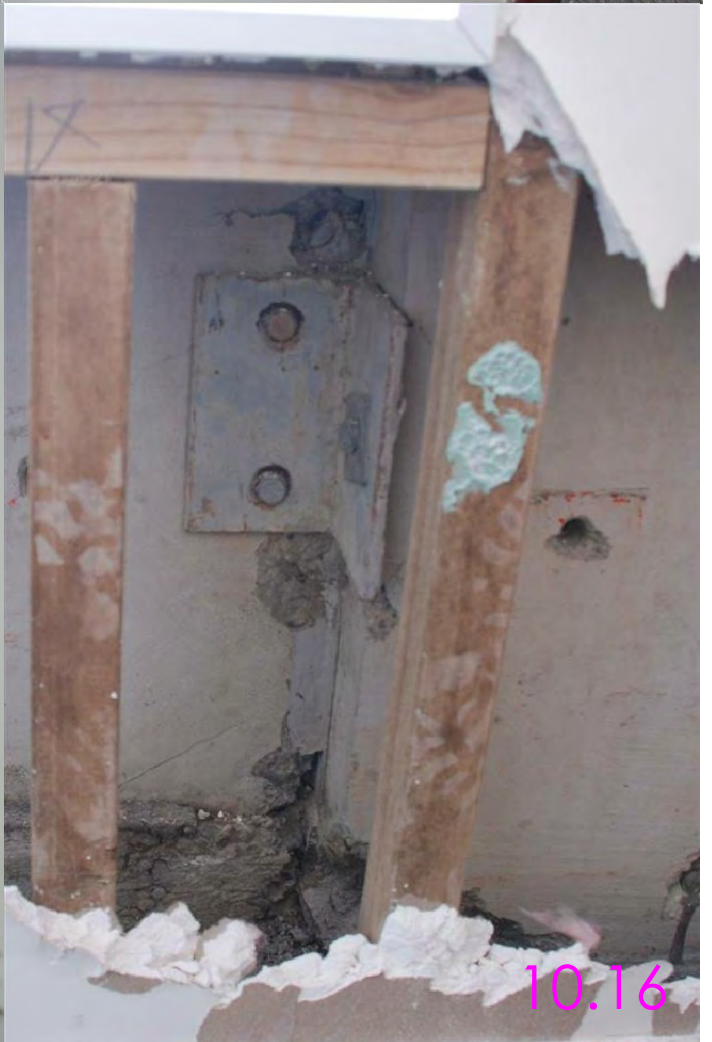








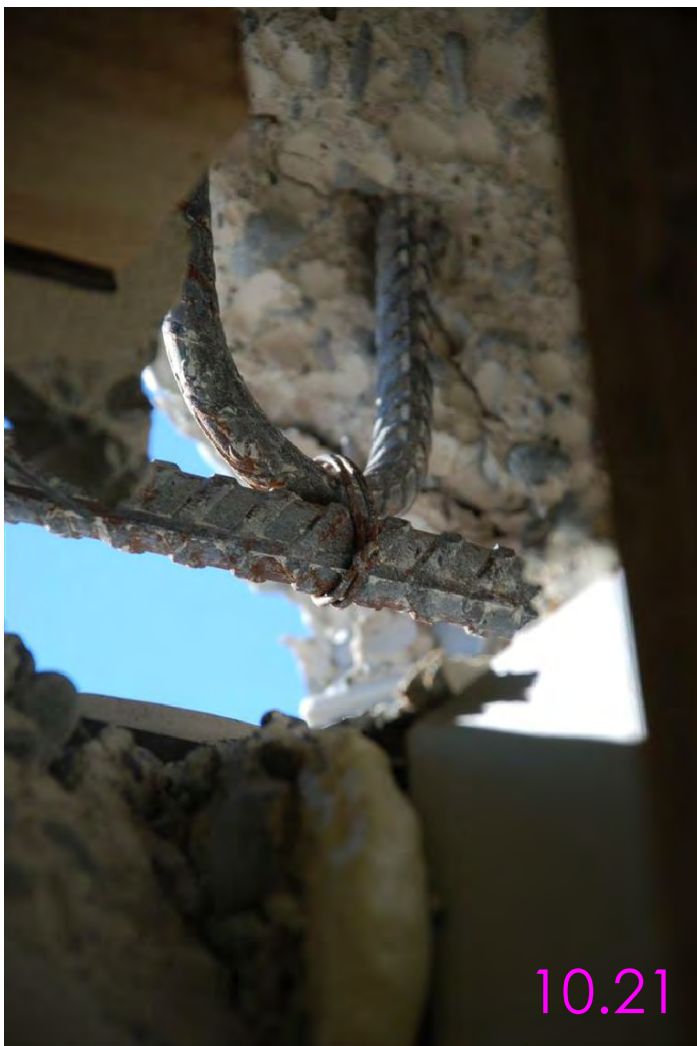




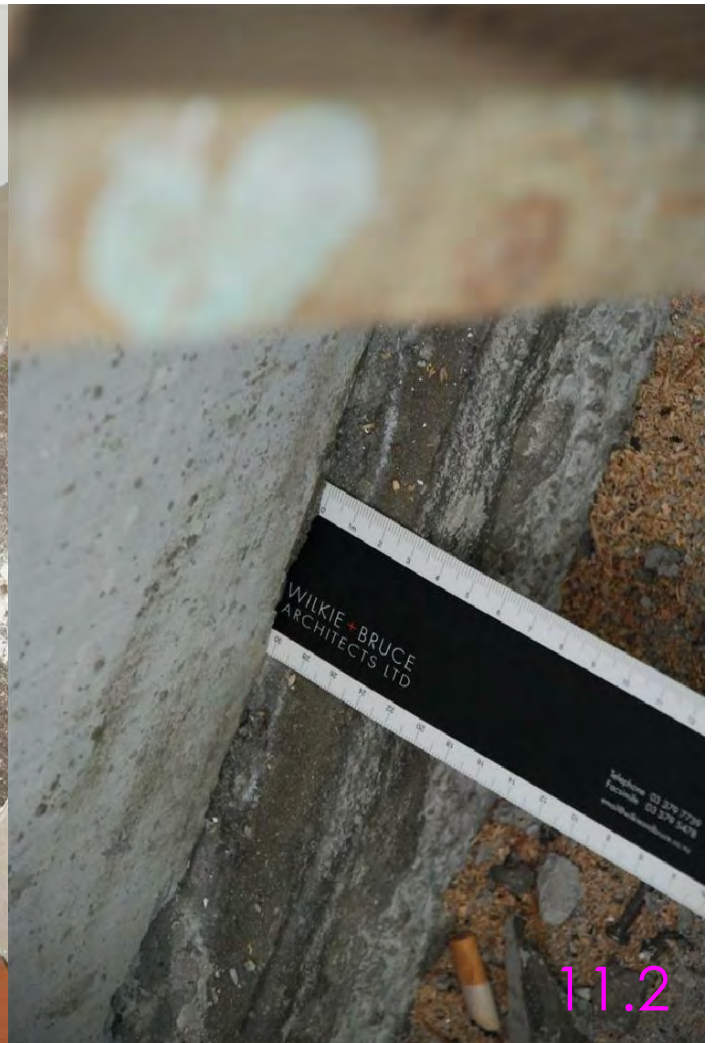
























11.13



11.14

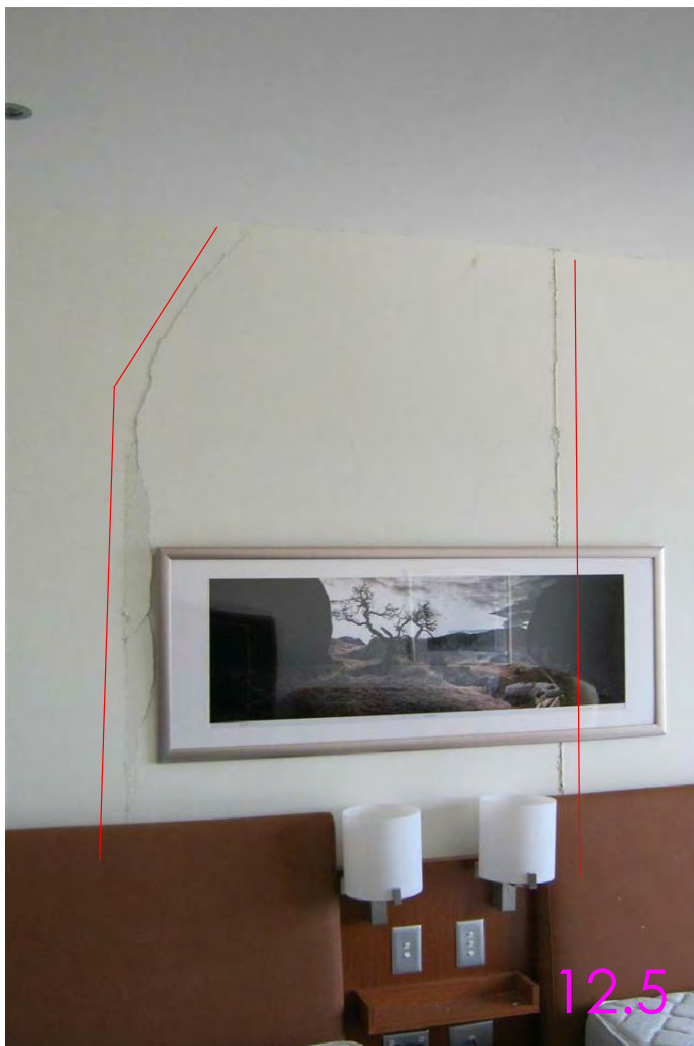


11.15

















12.13



12.14



12.15



12.16













13.1



13.2



13.3

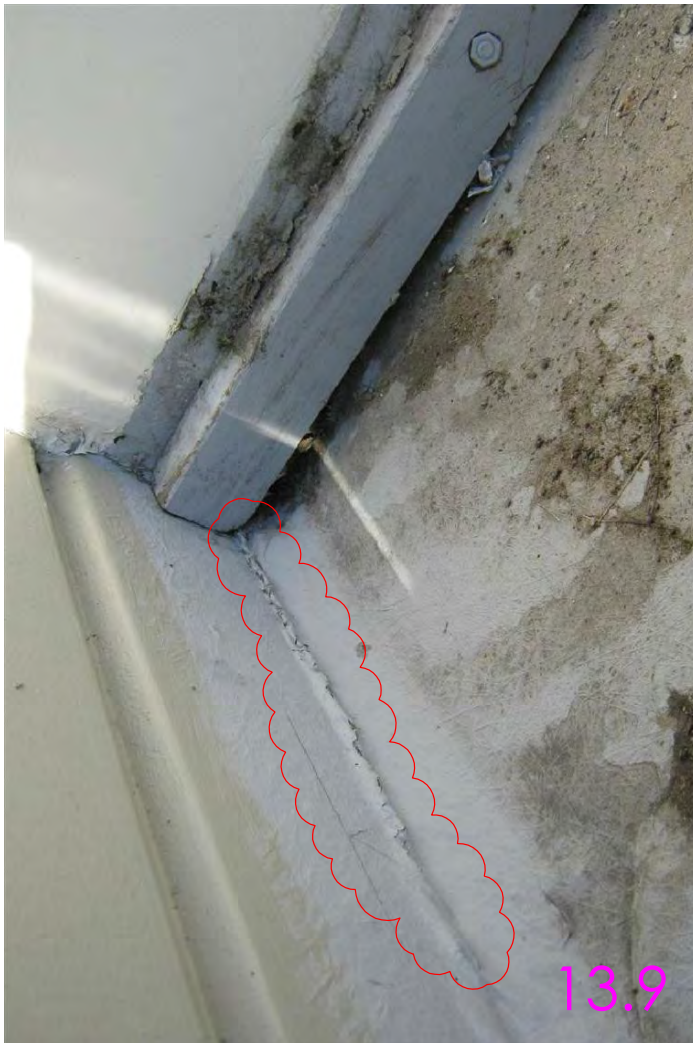


13.4









13.9



13.10

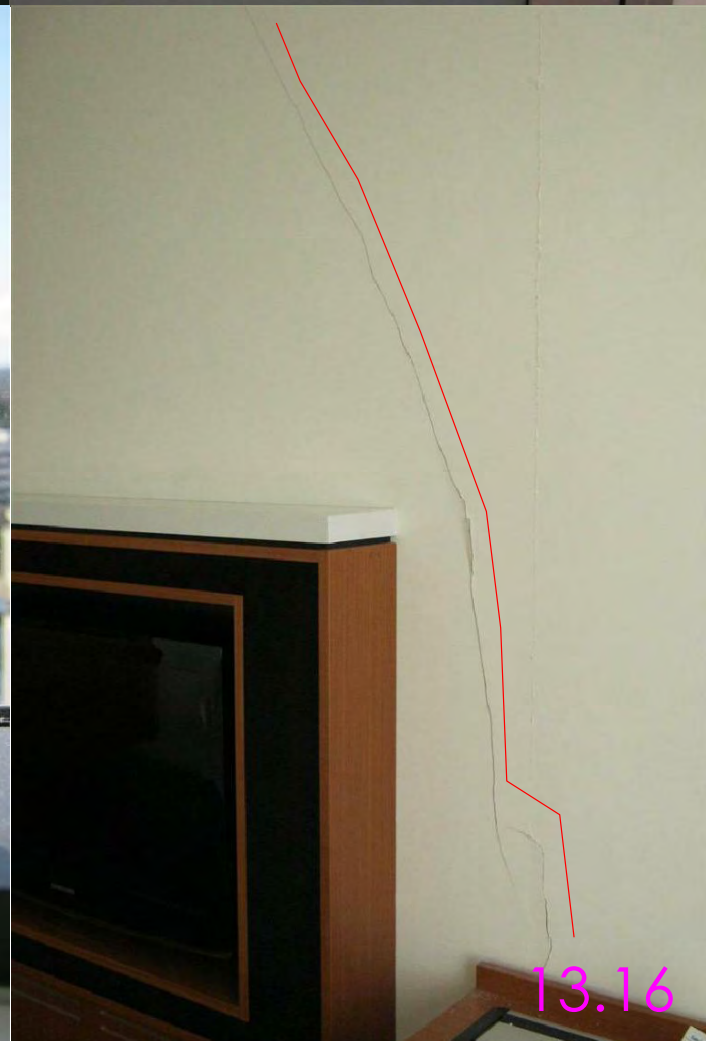


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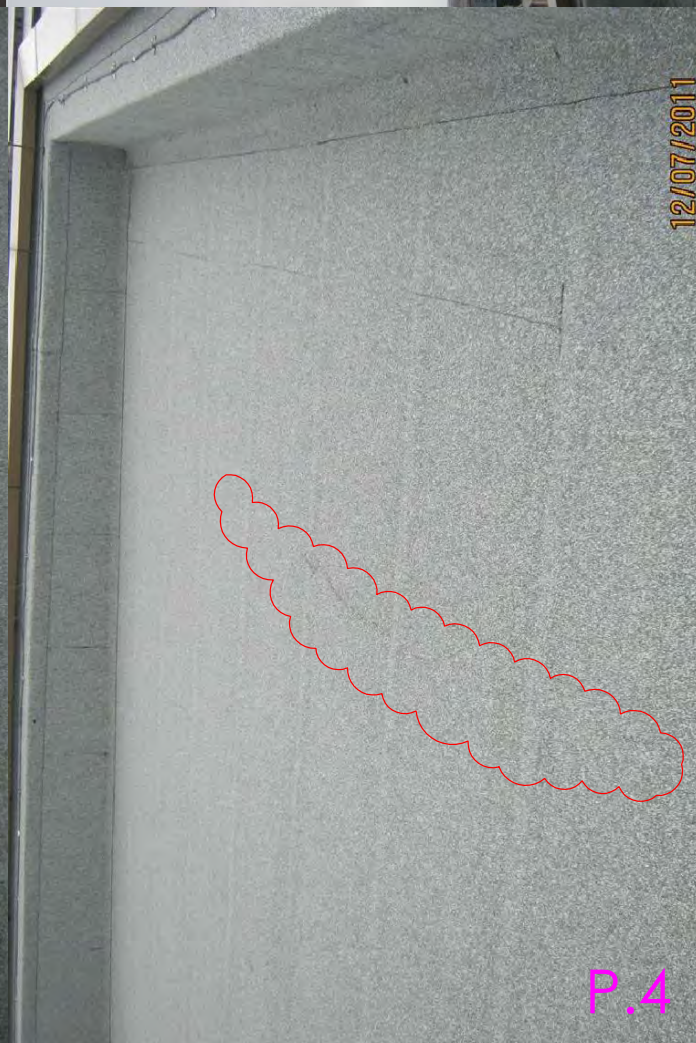
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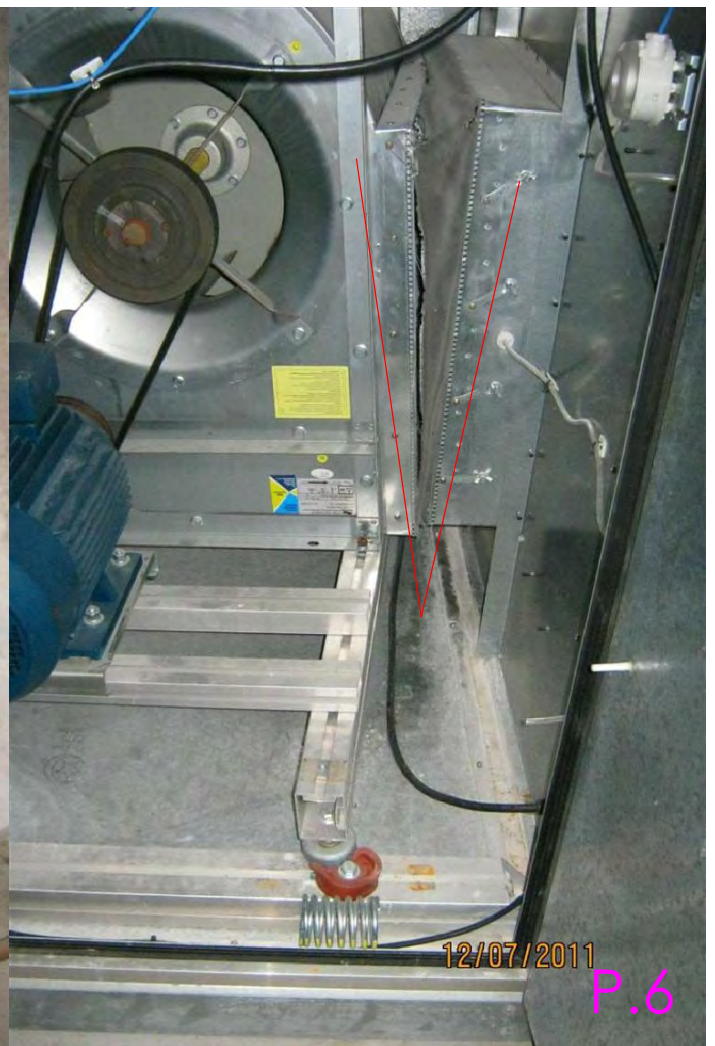








P.5



P.6



P.7

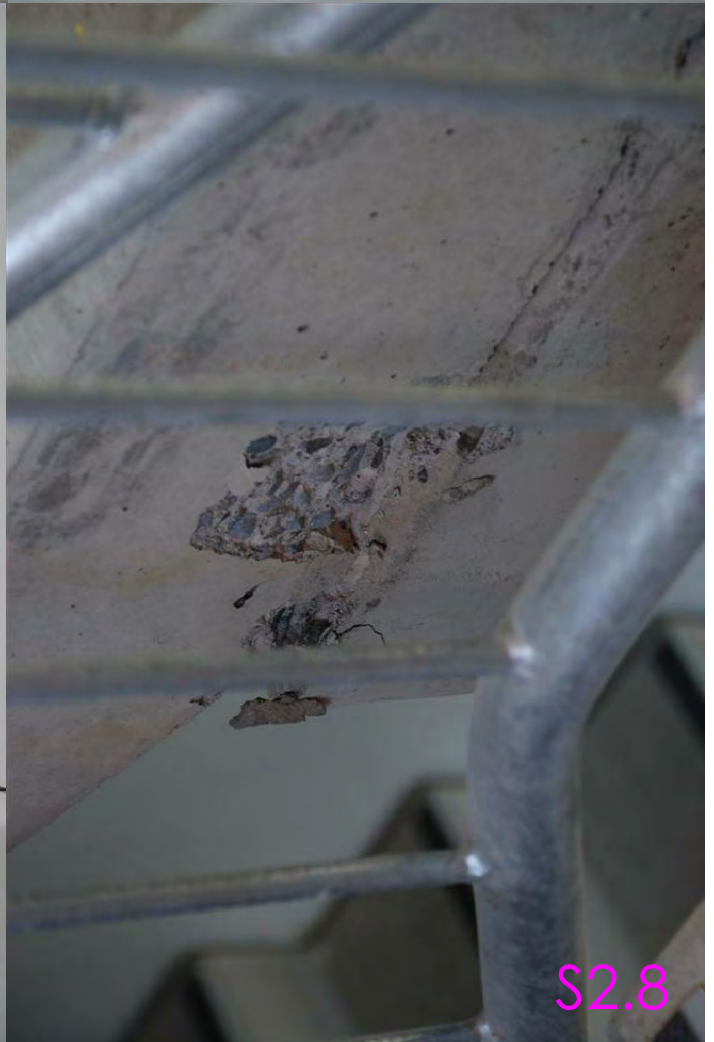


P.8





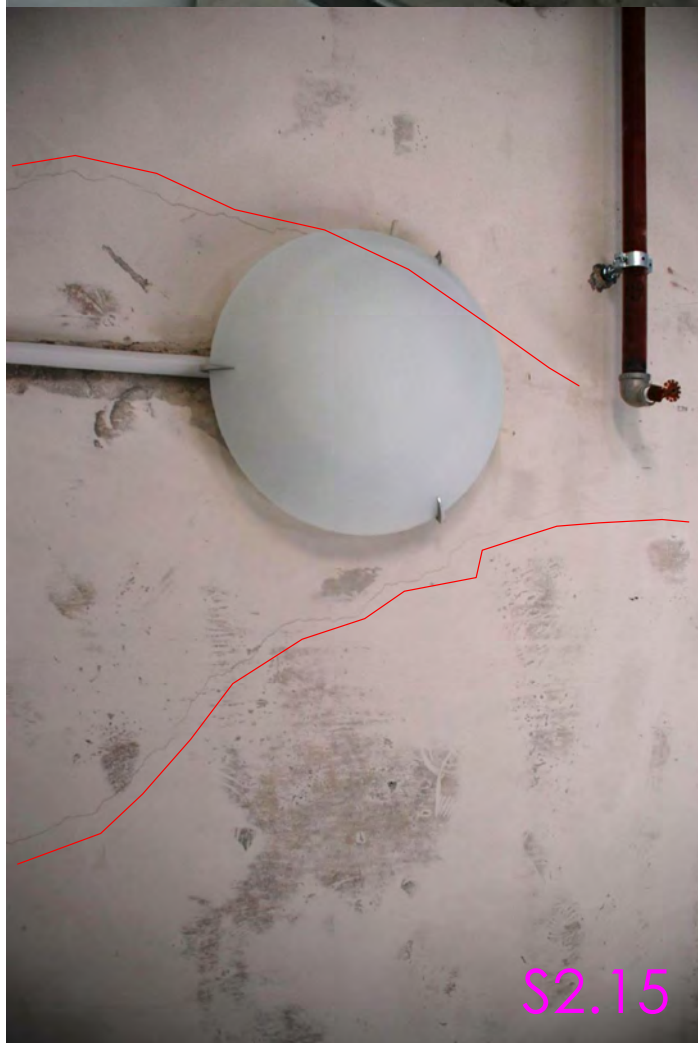








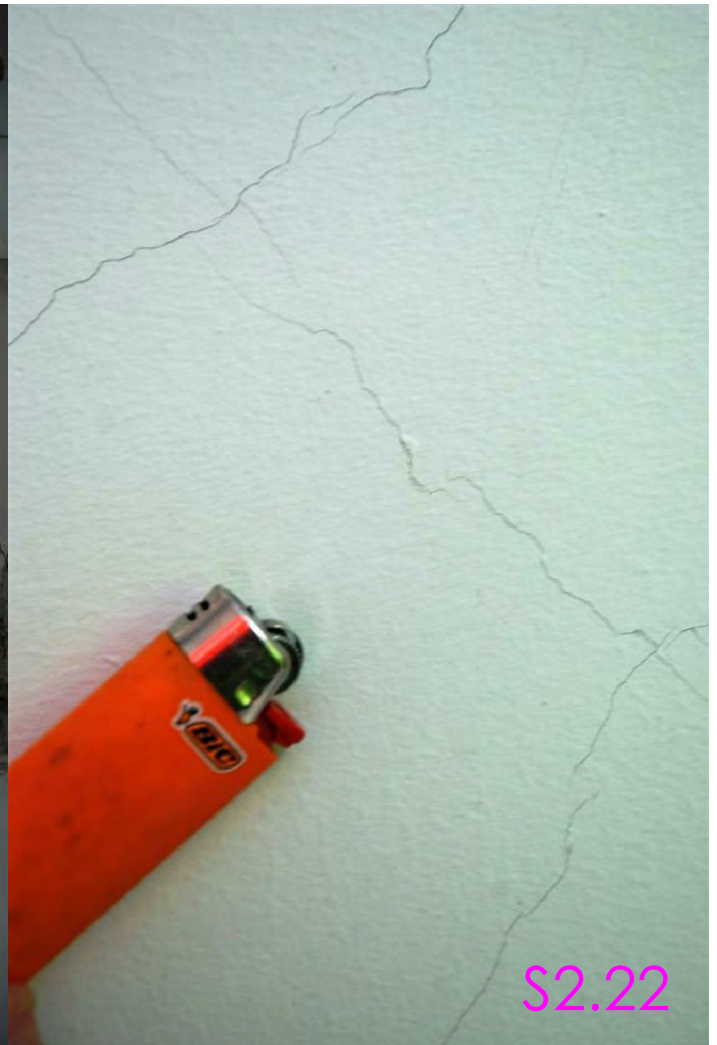








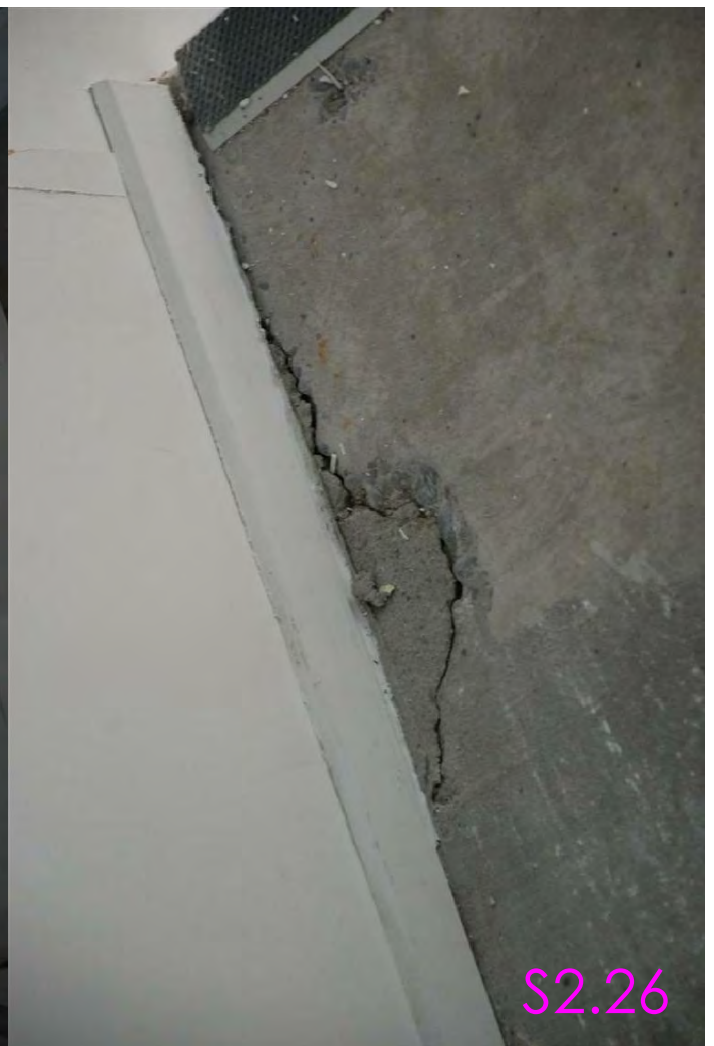




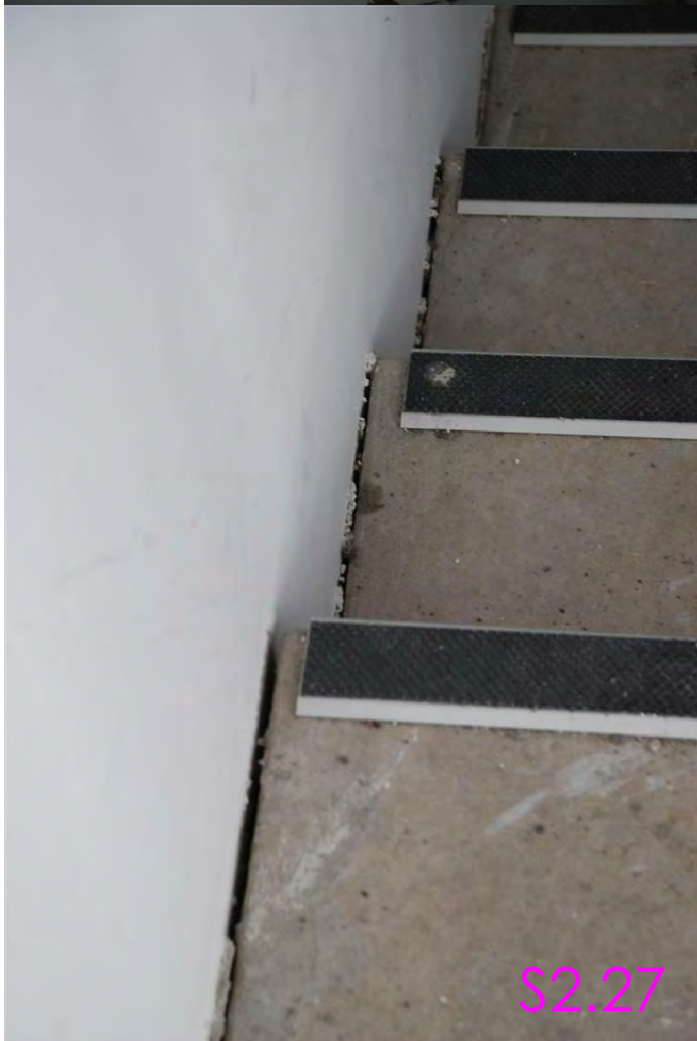




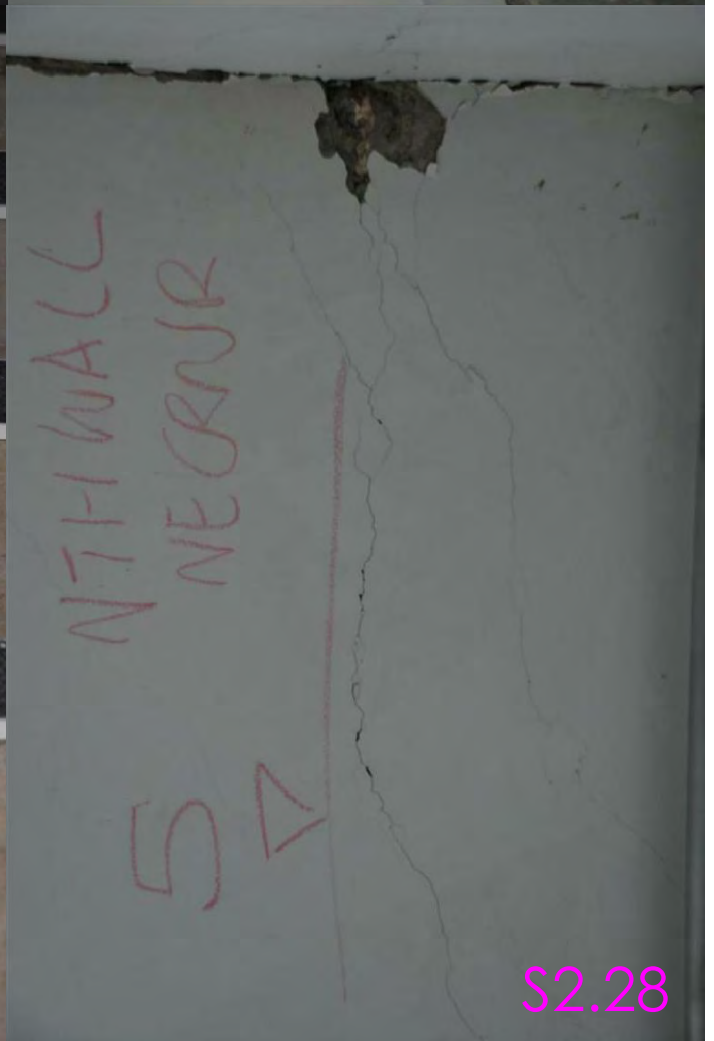
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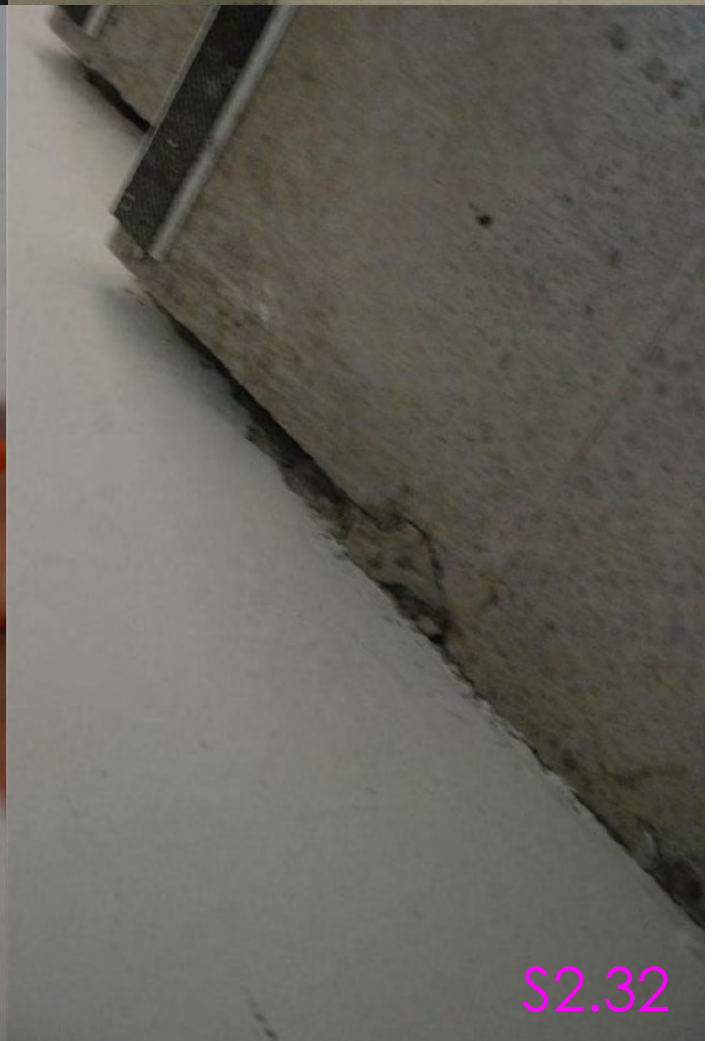
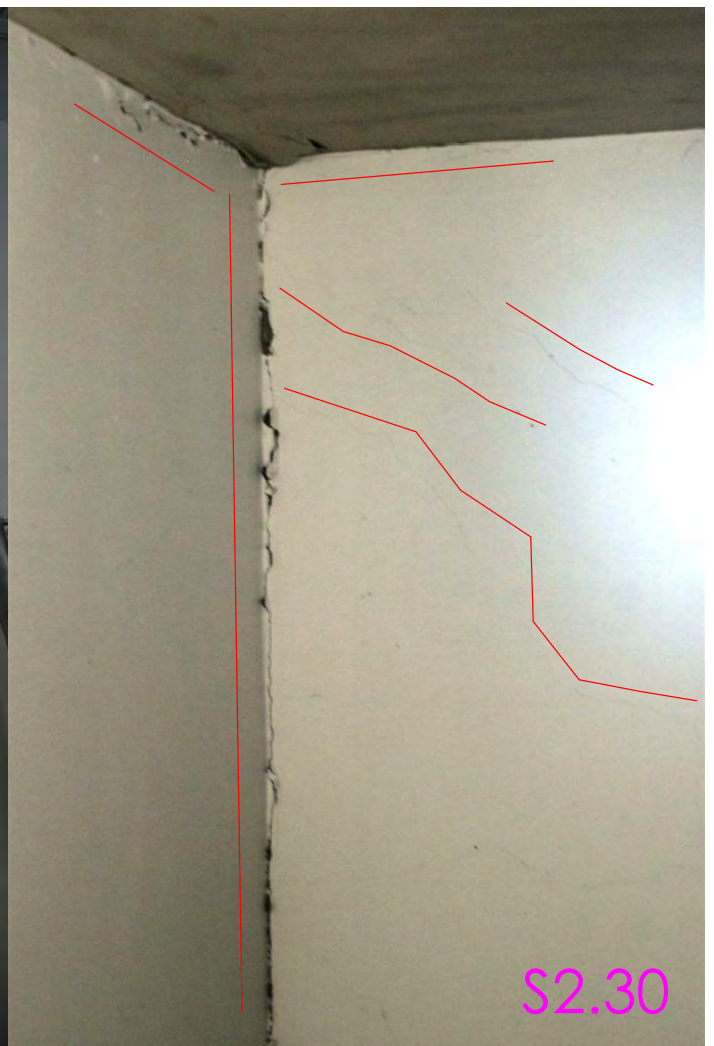
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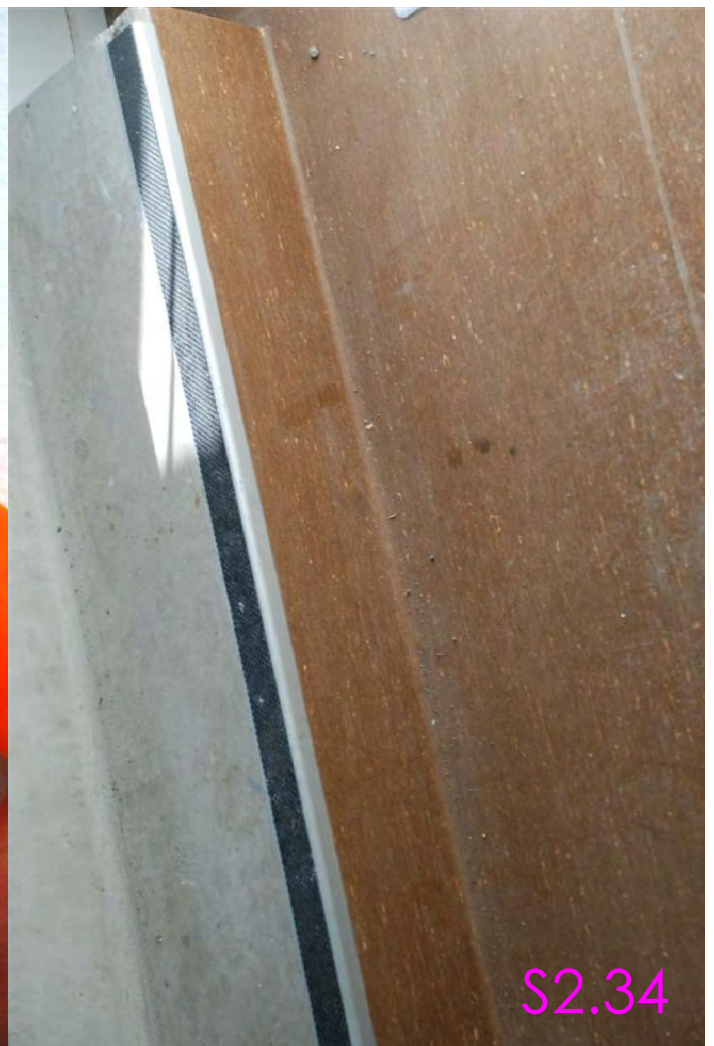
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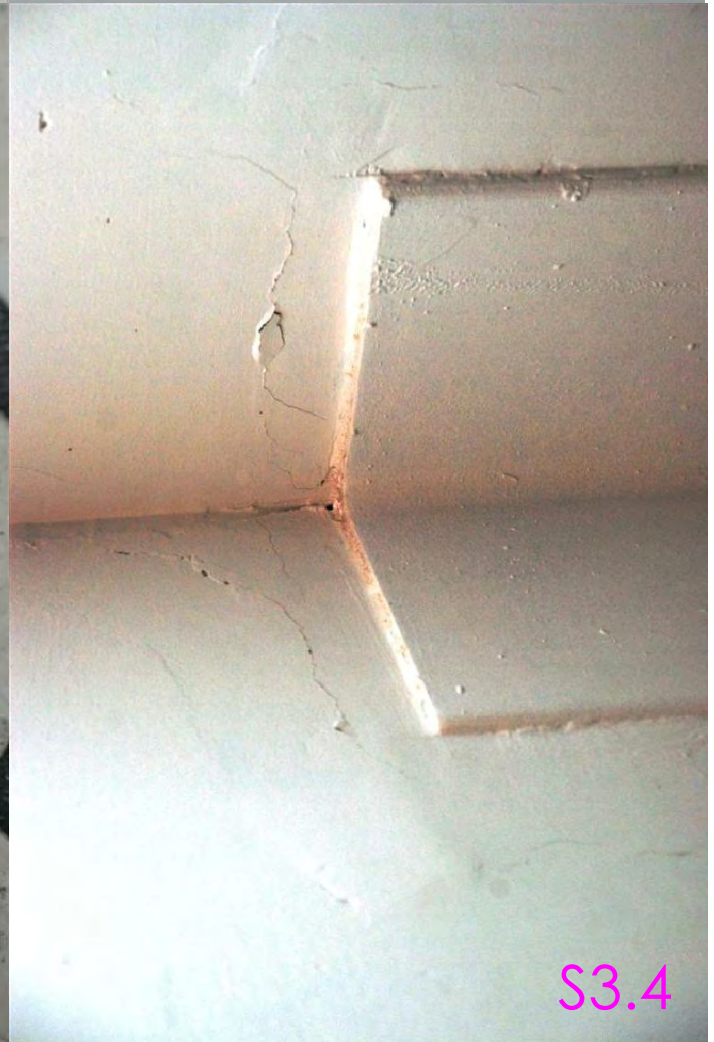
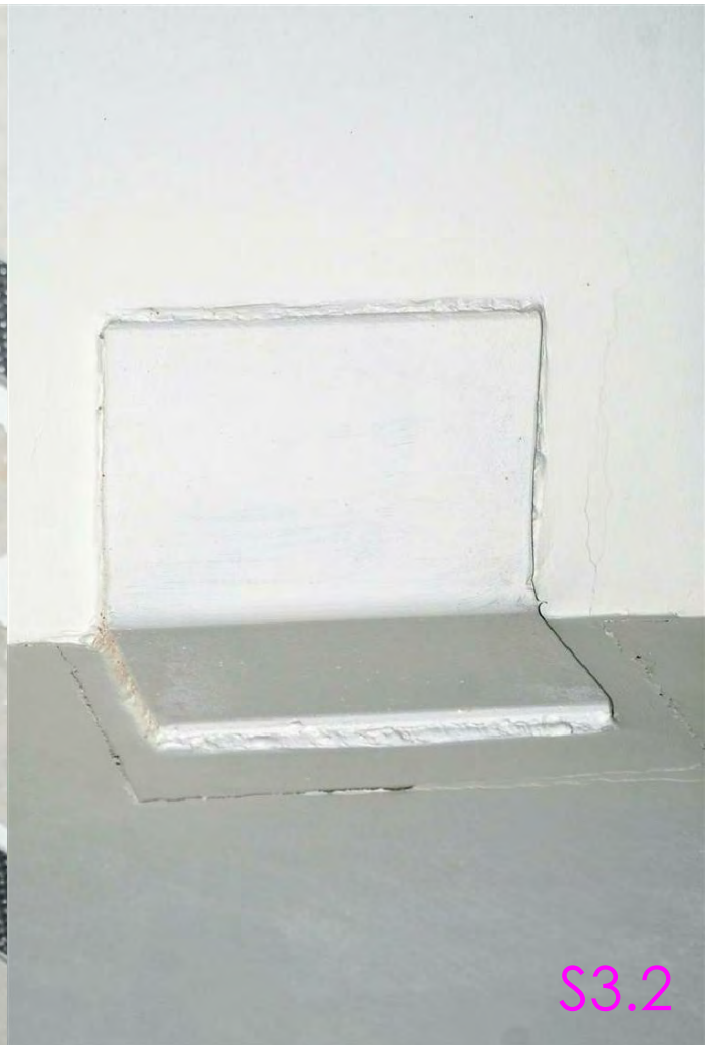
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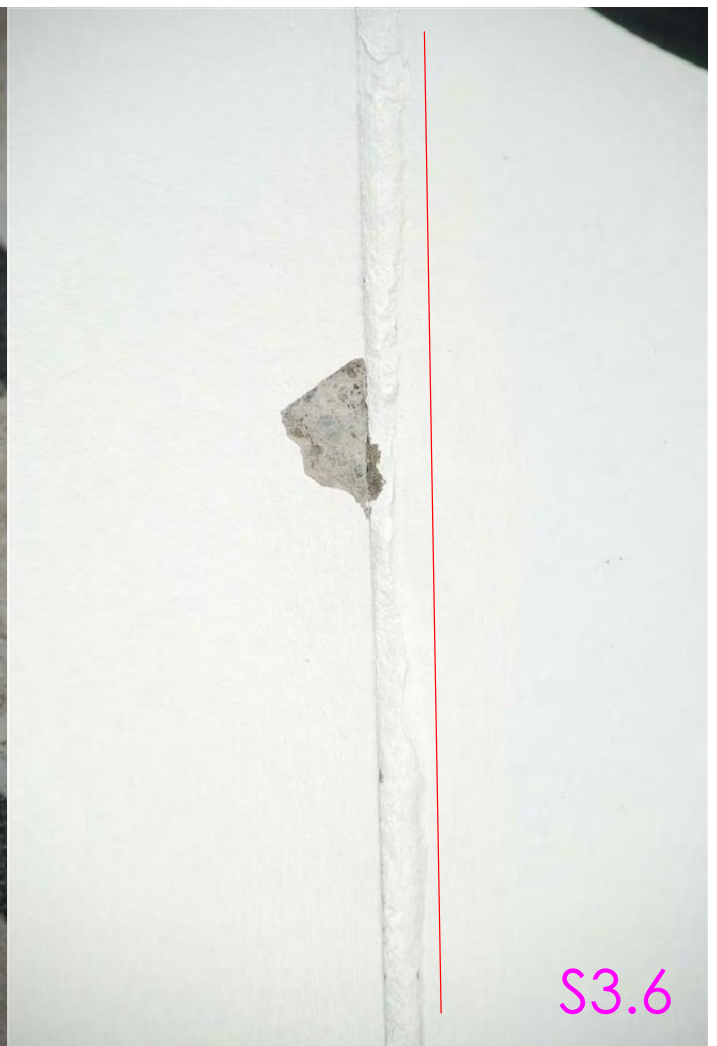










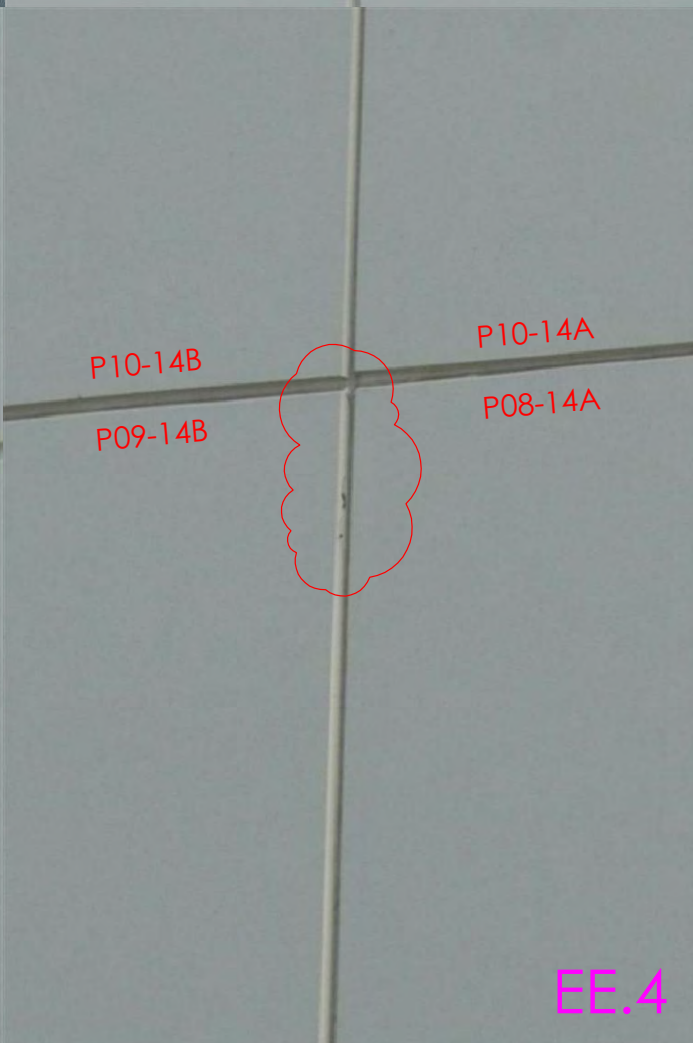
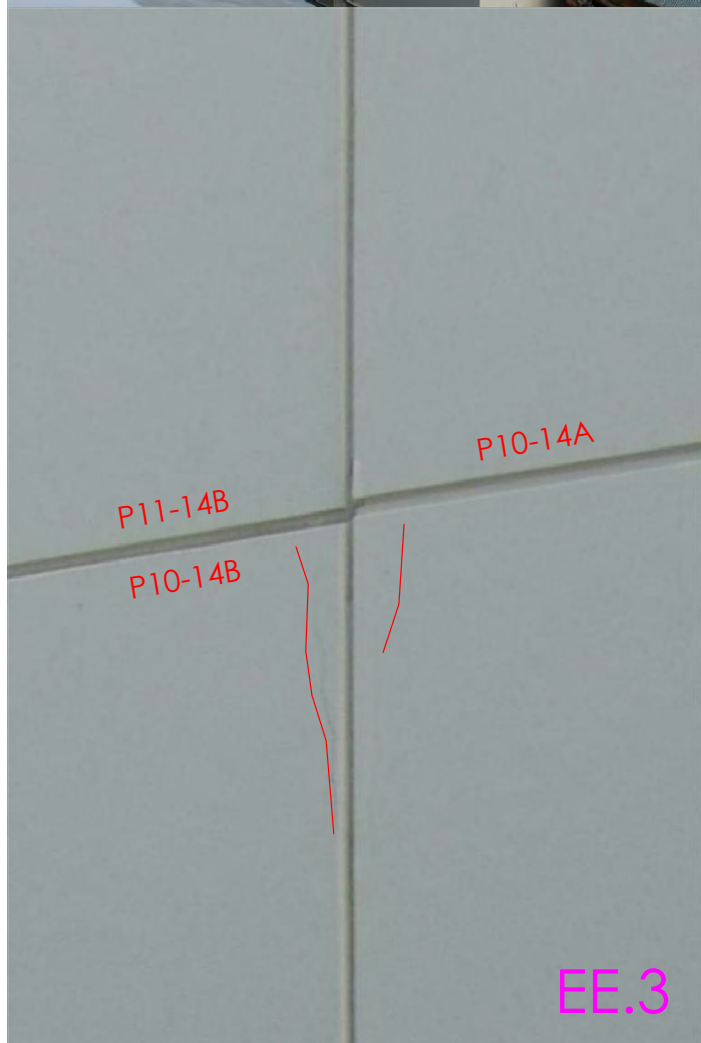
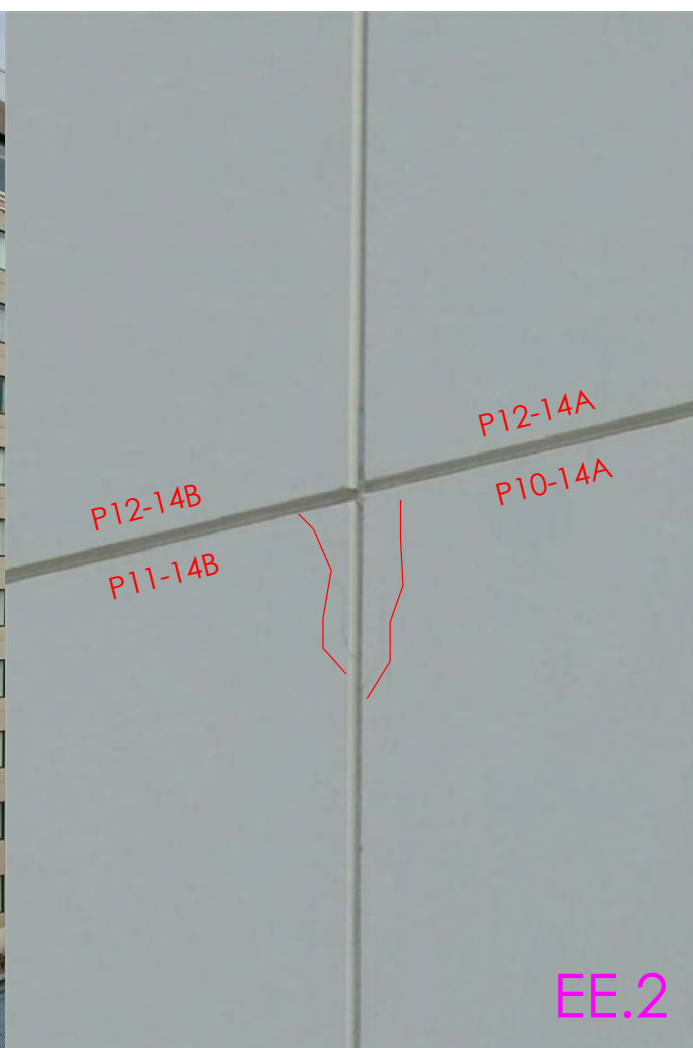
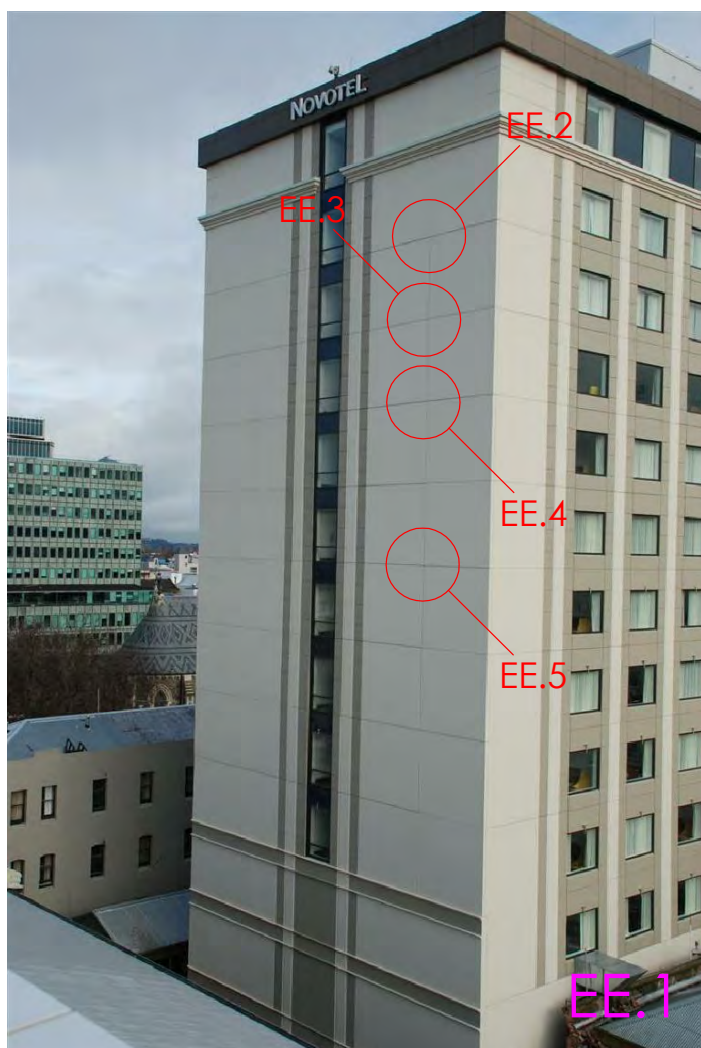




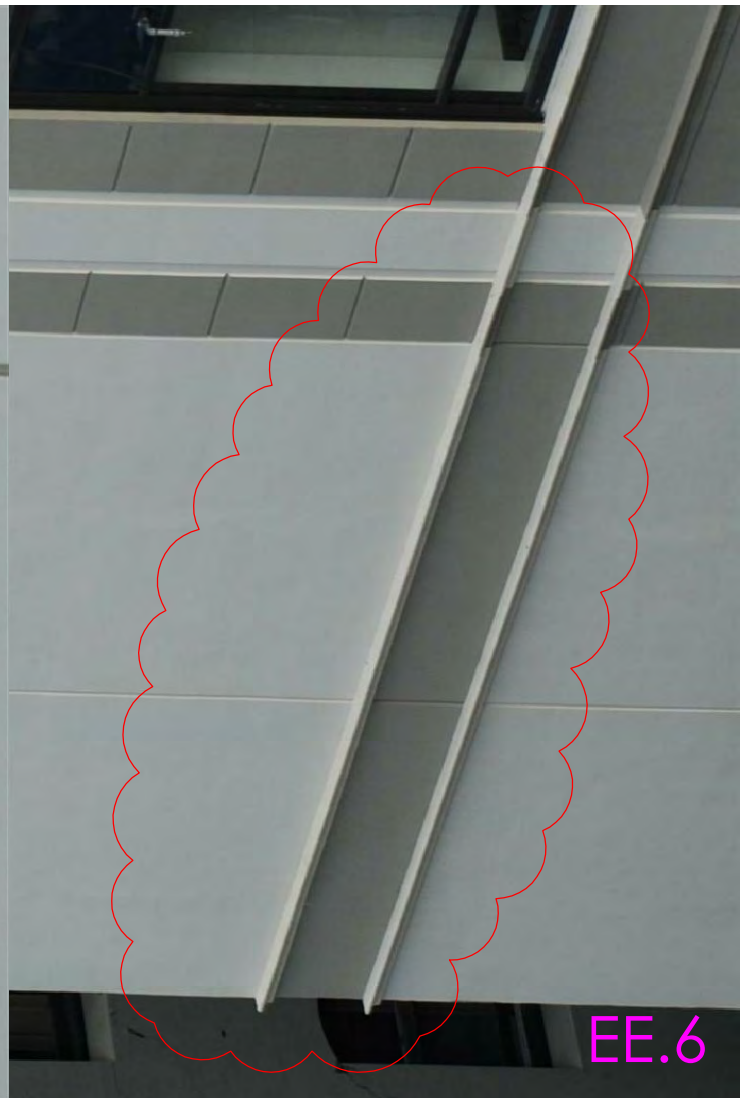
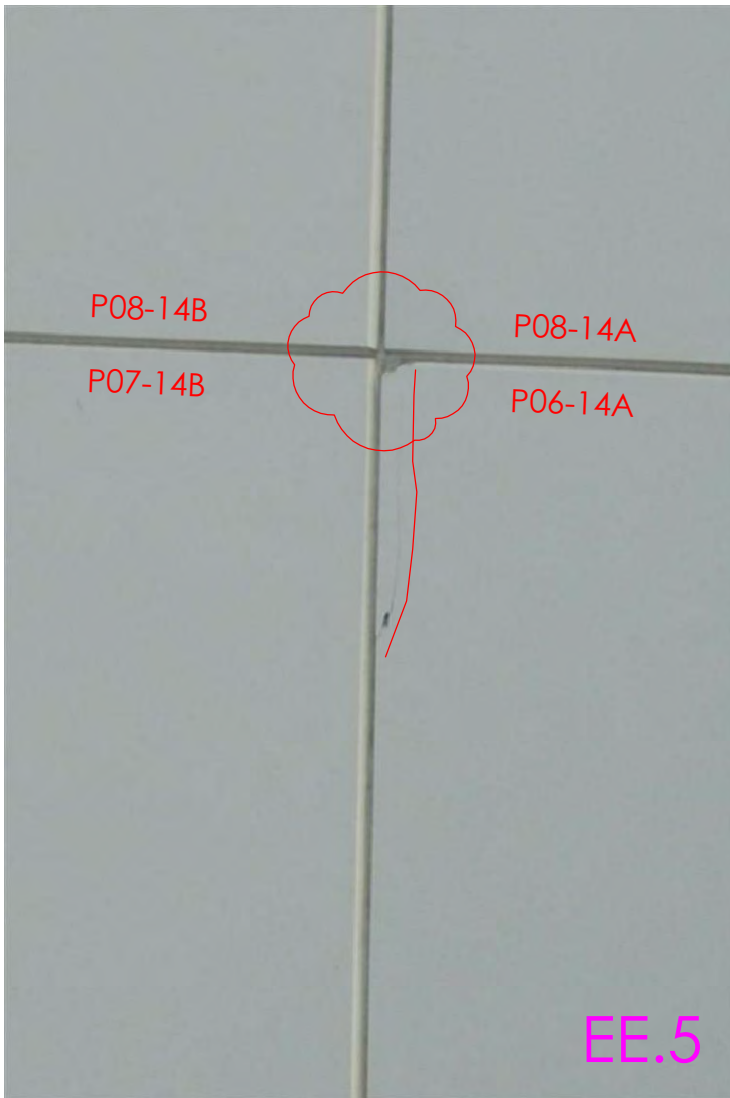


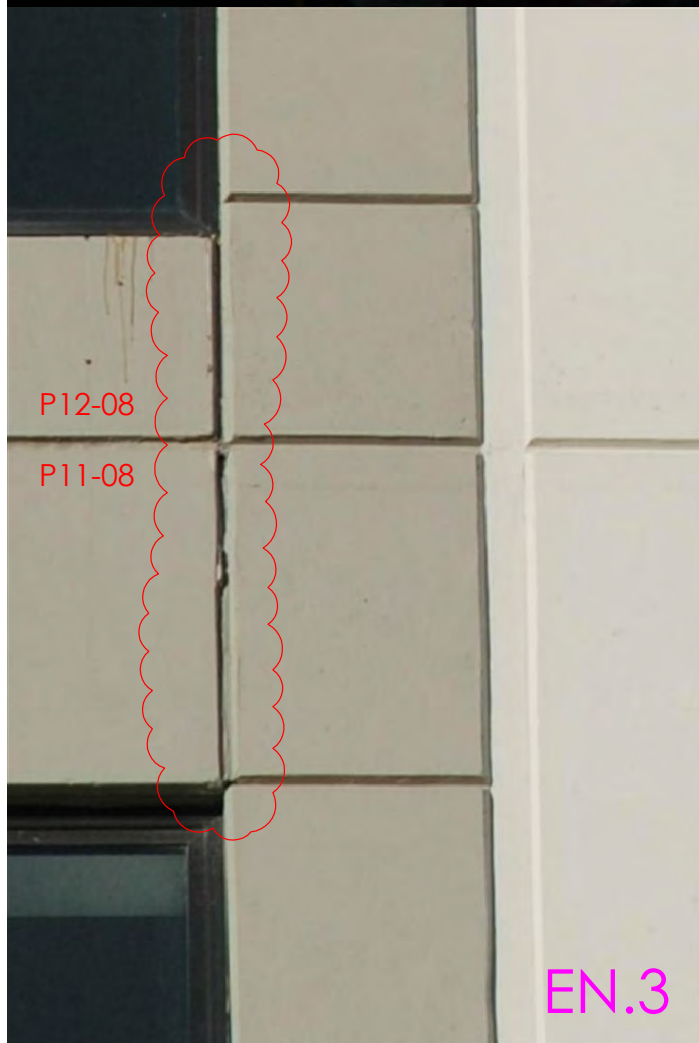
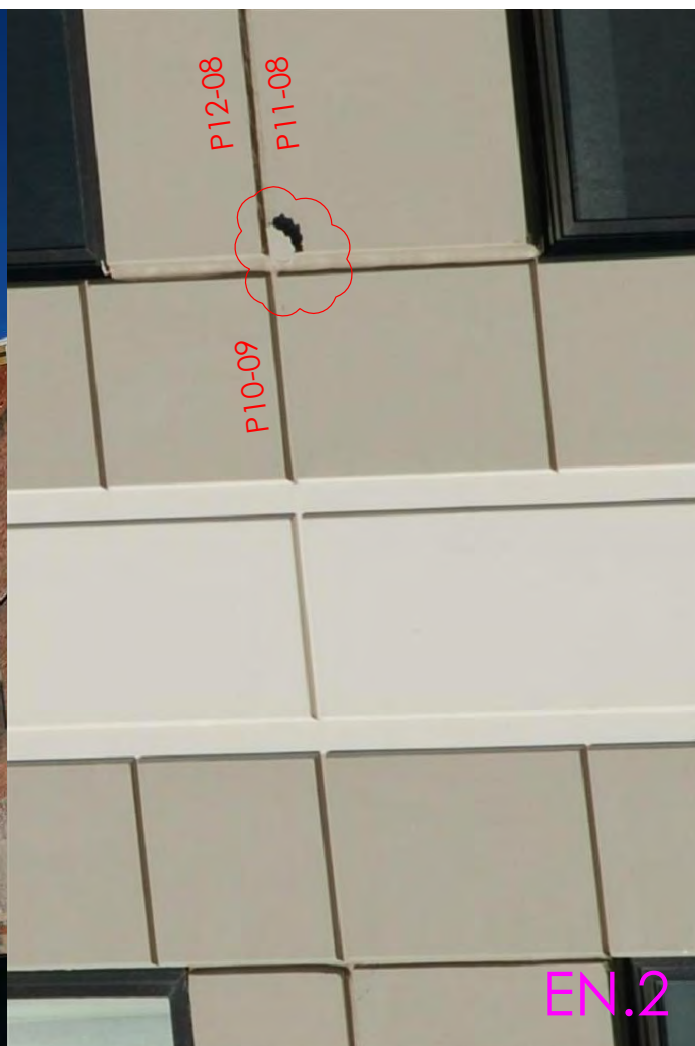




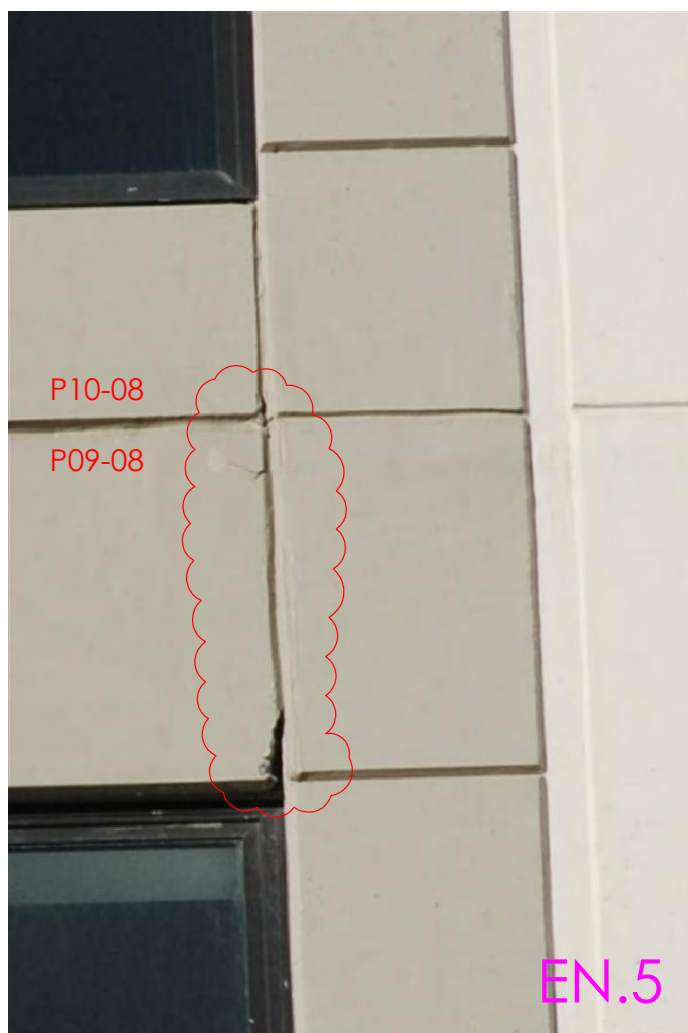


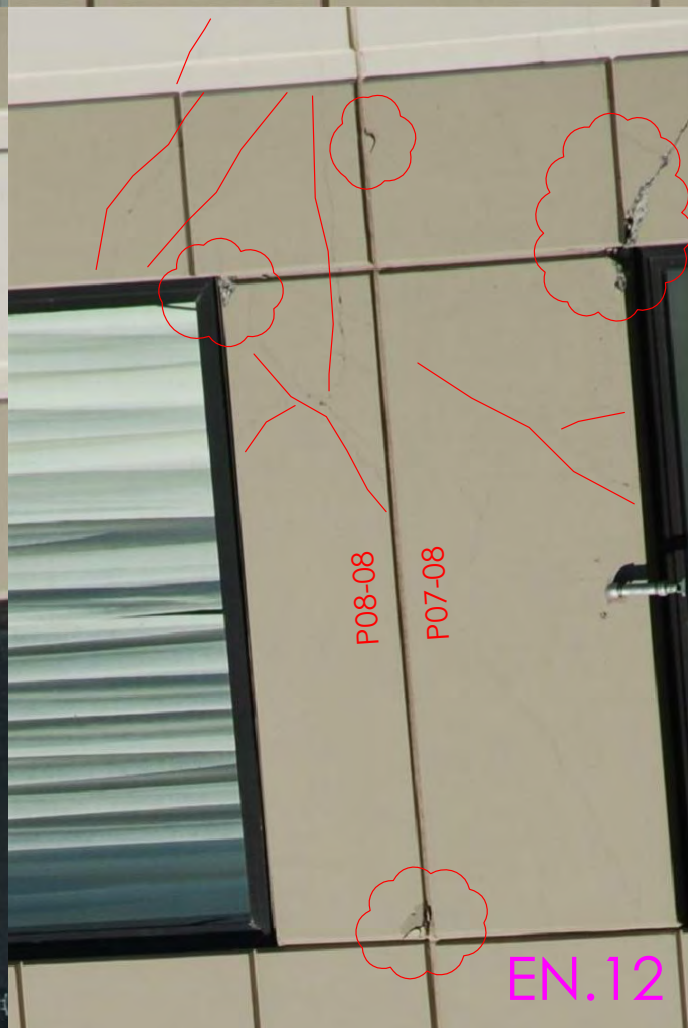
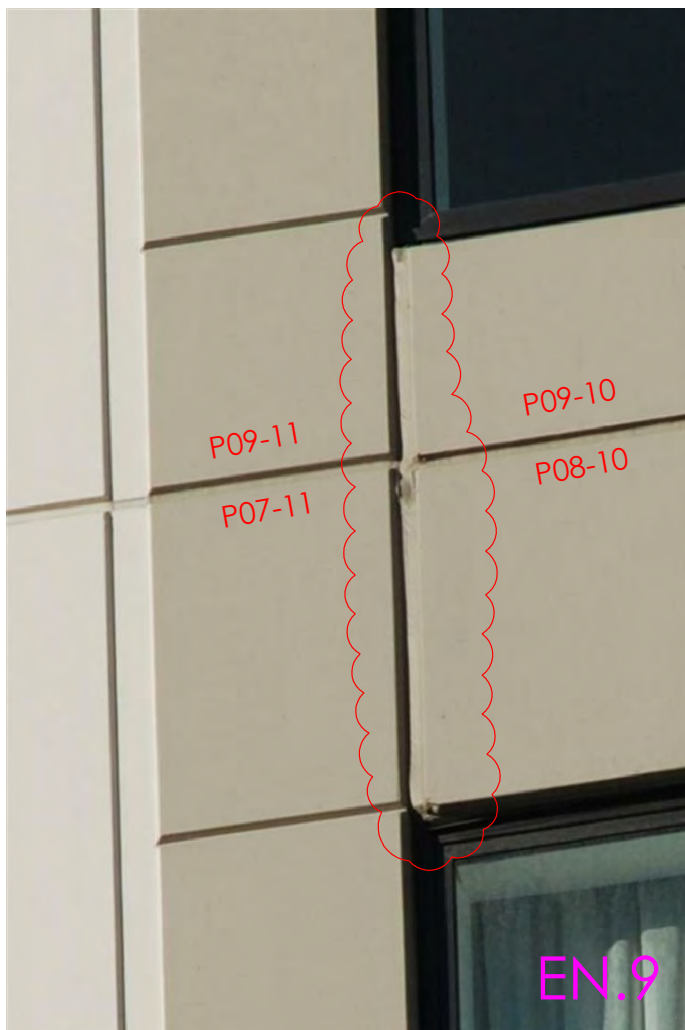




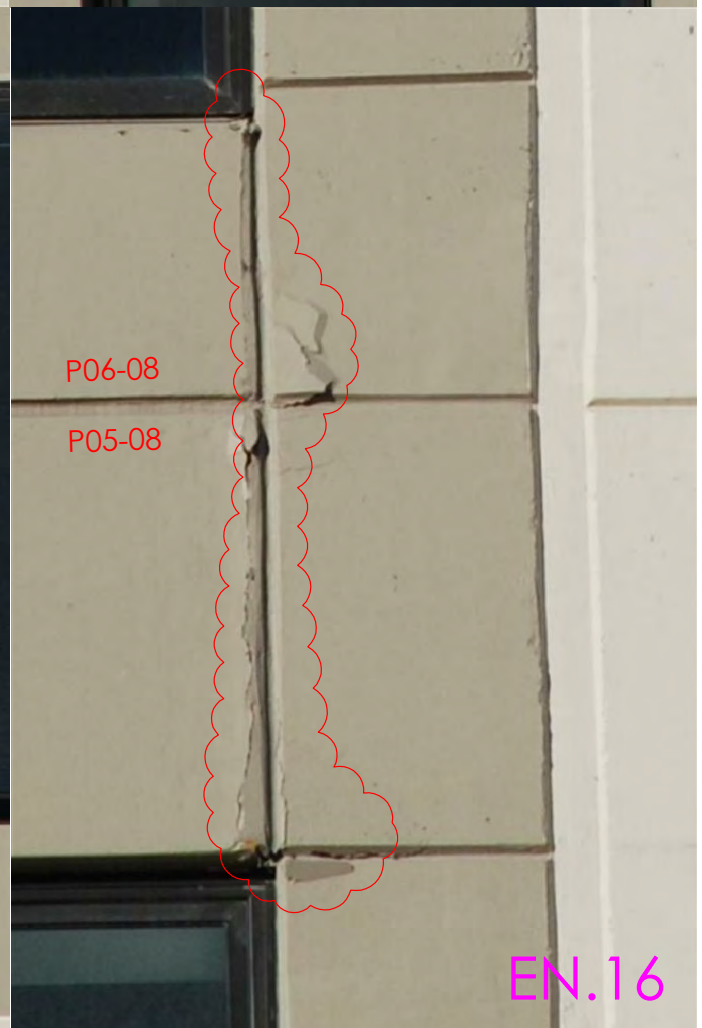
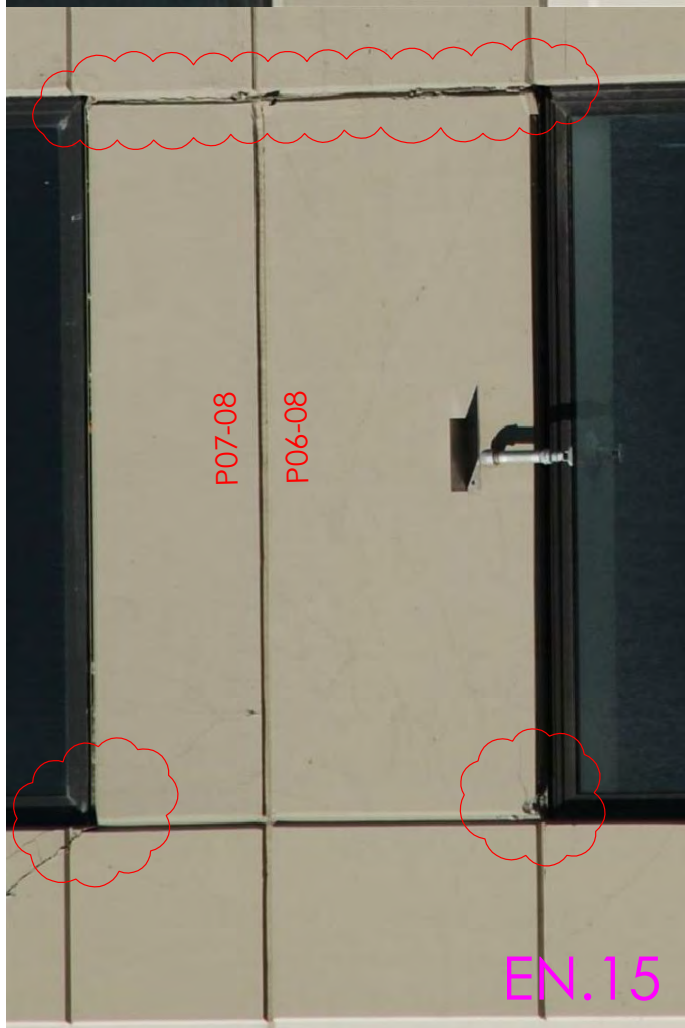
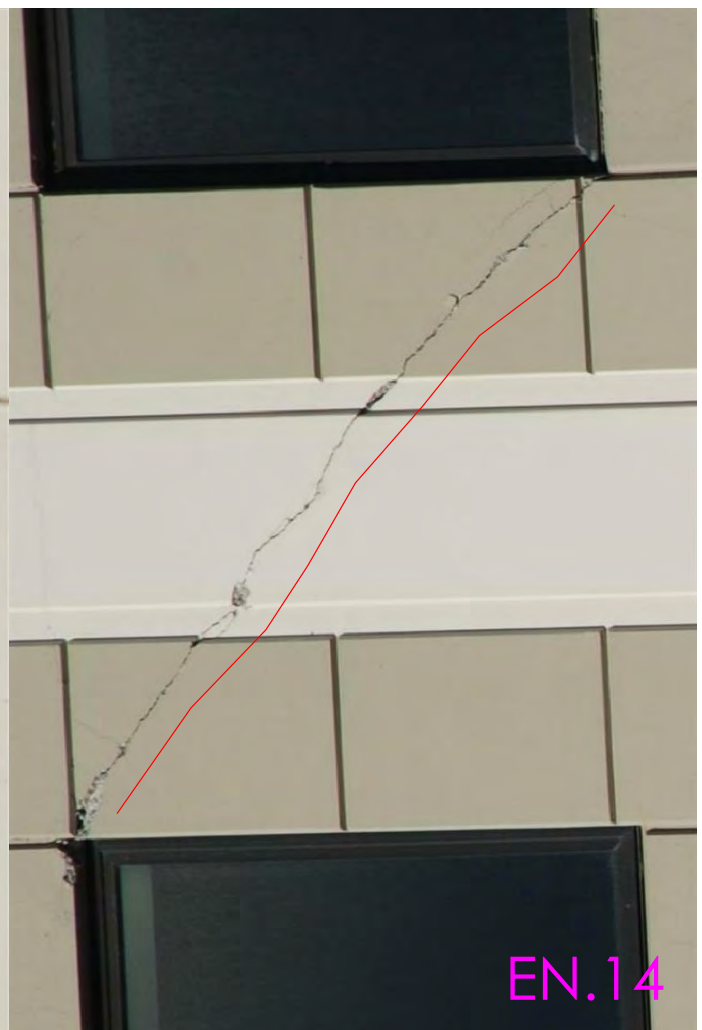
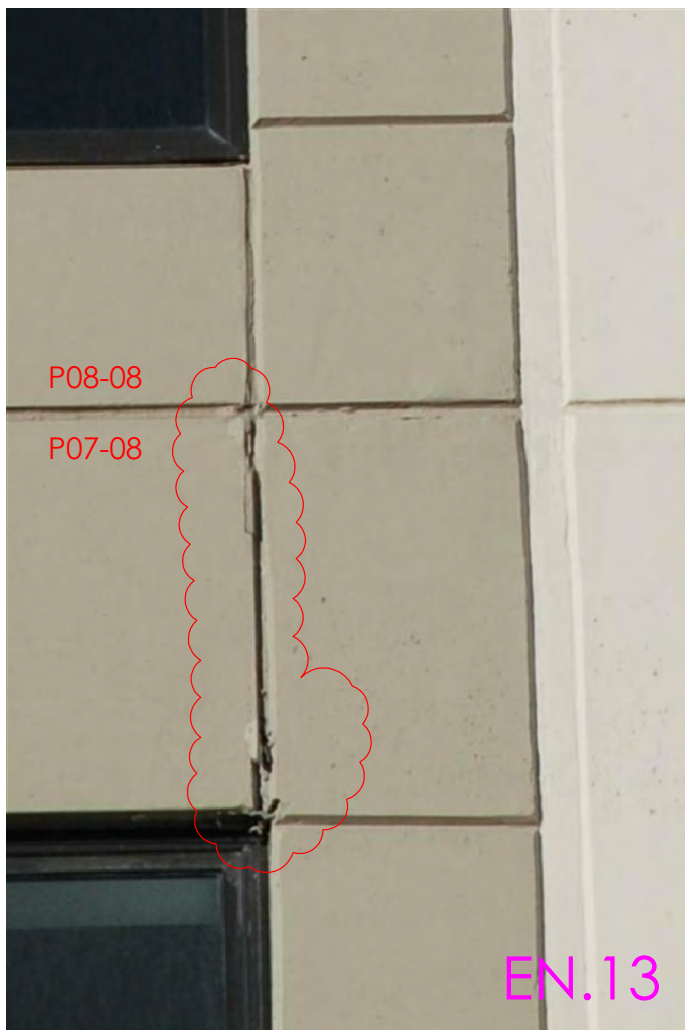


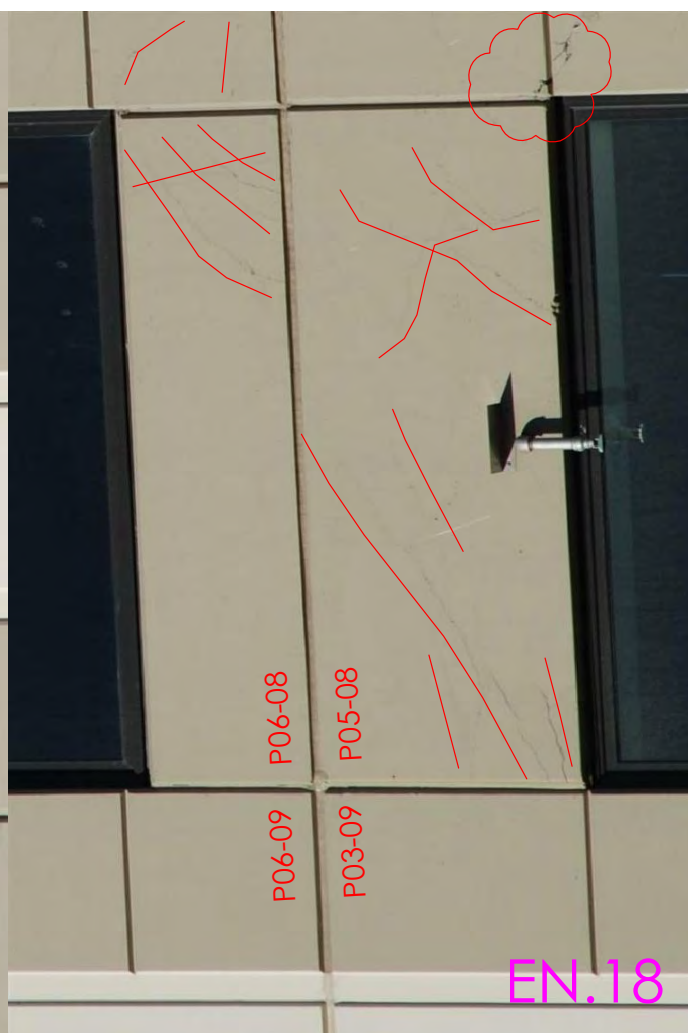
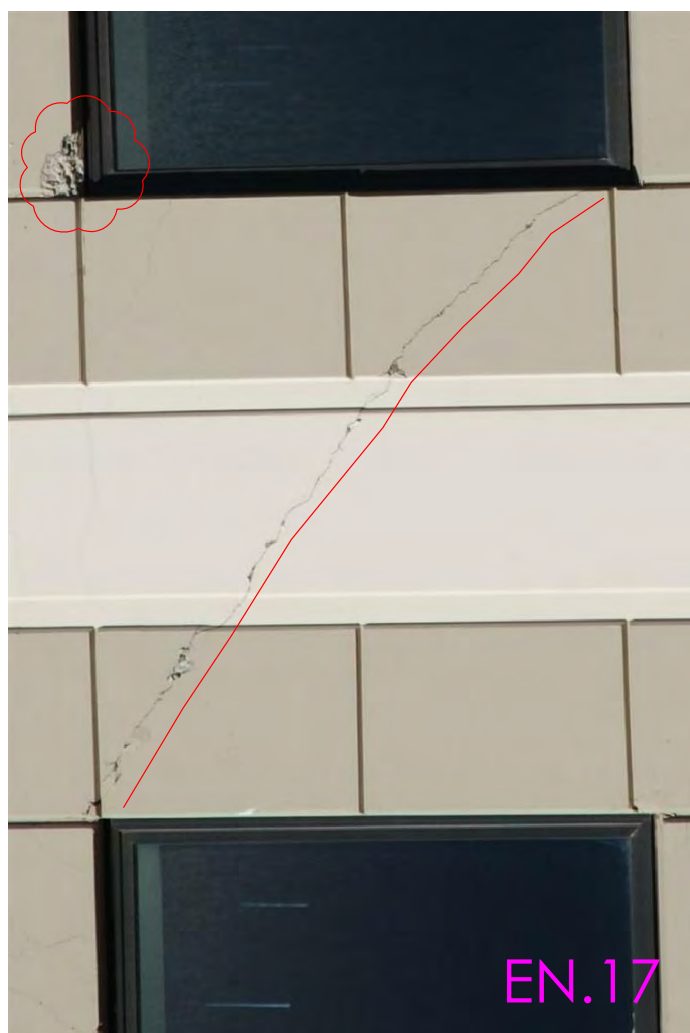




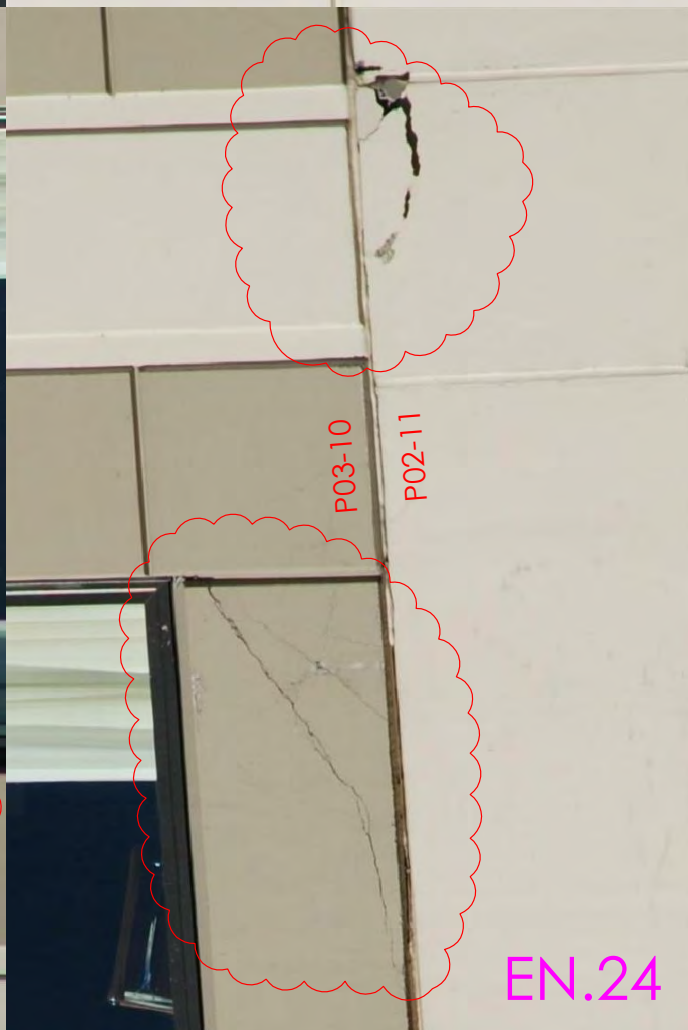
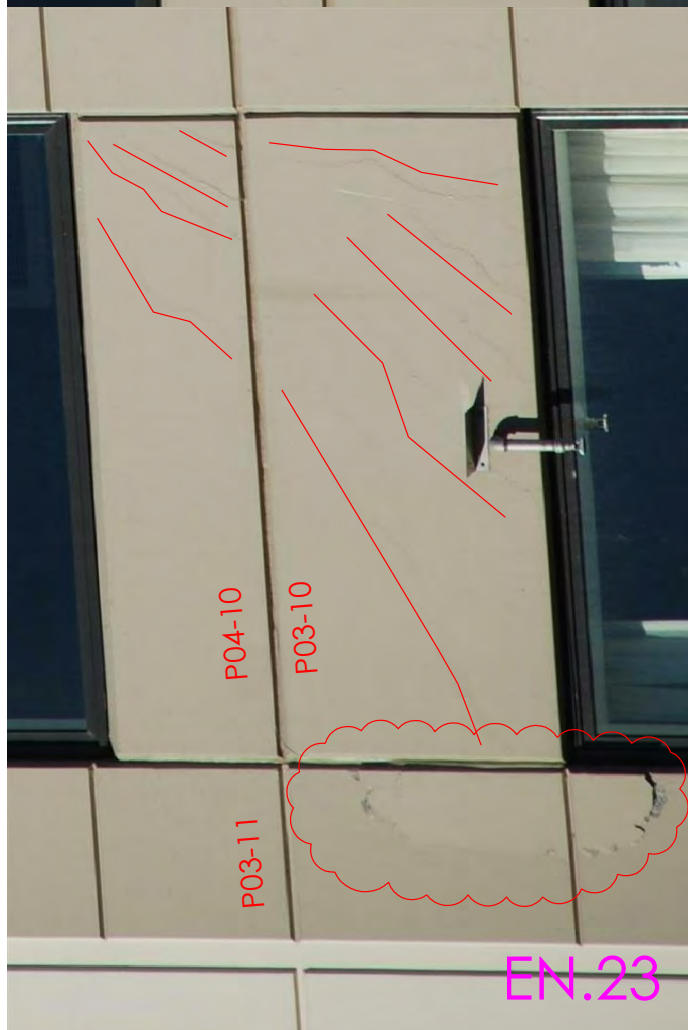
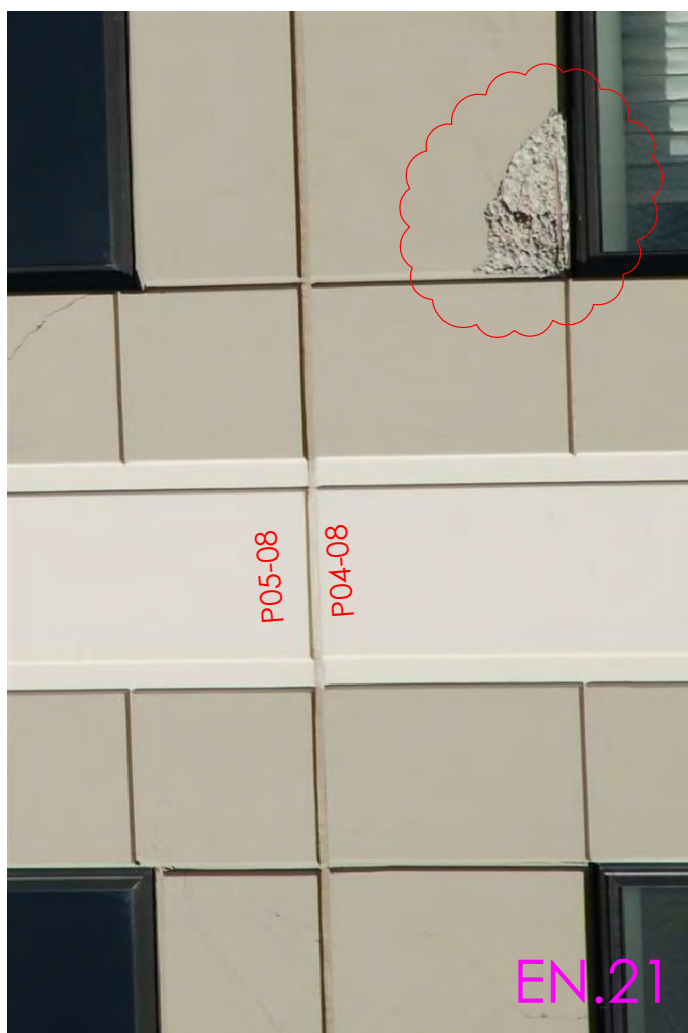


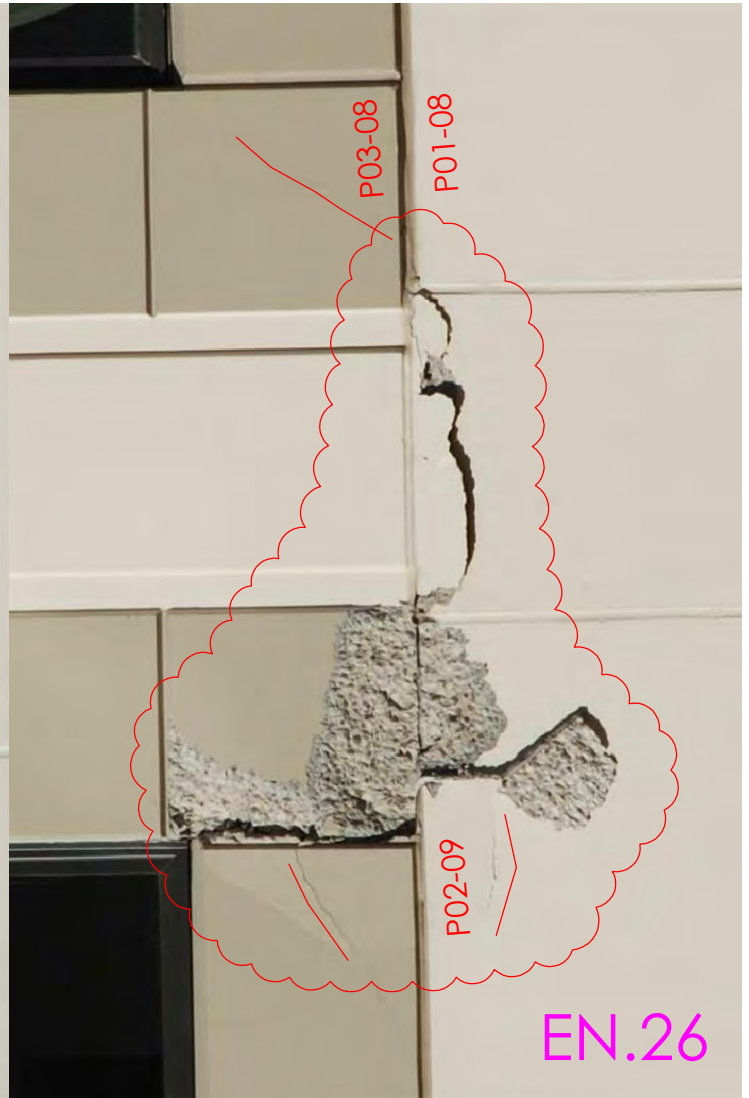
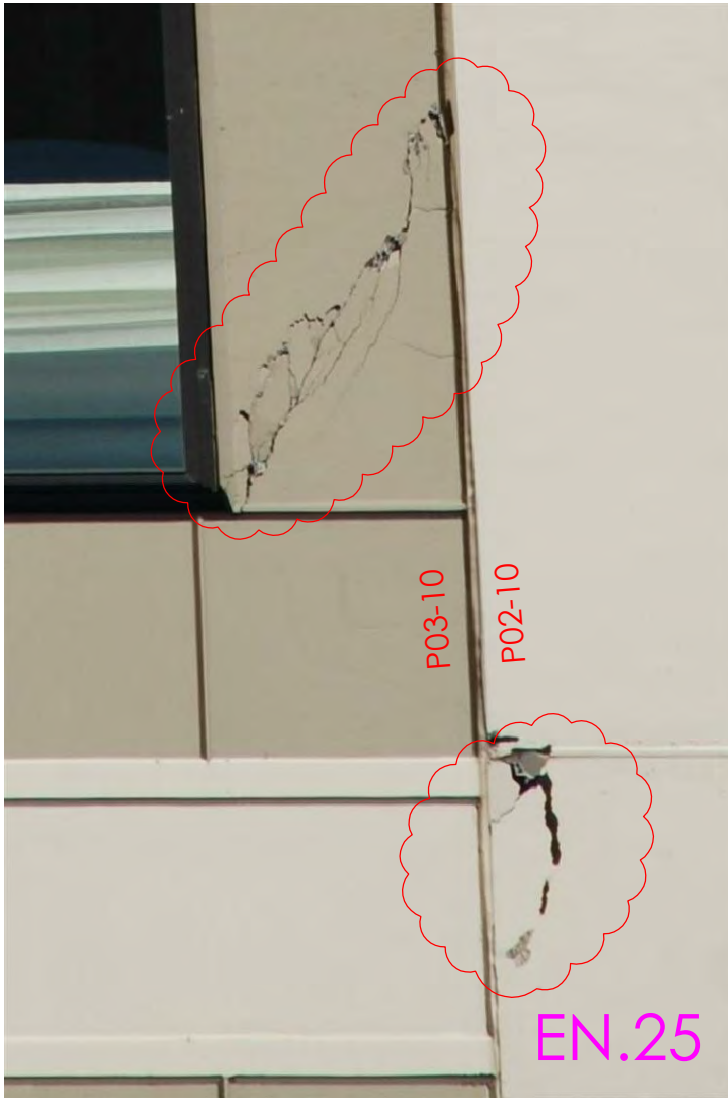




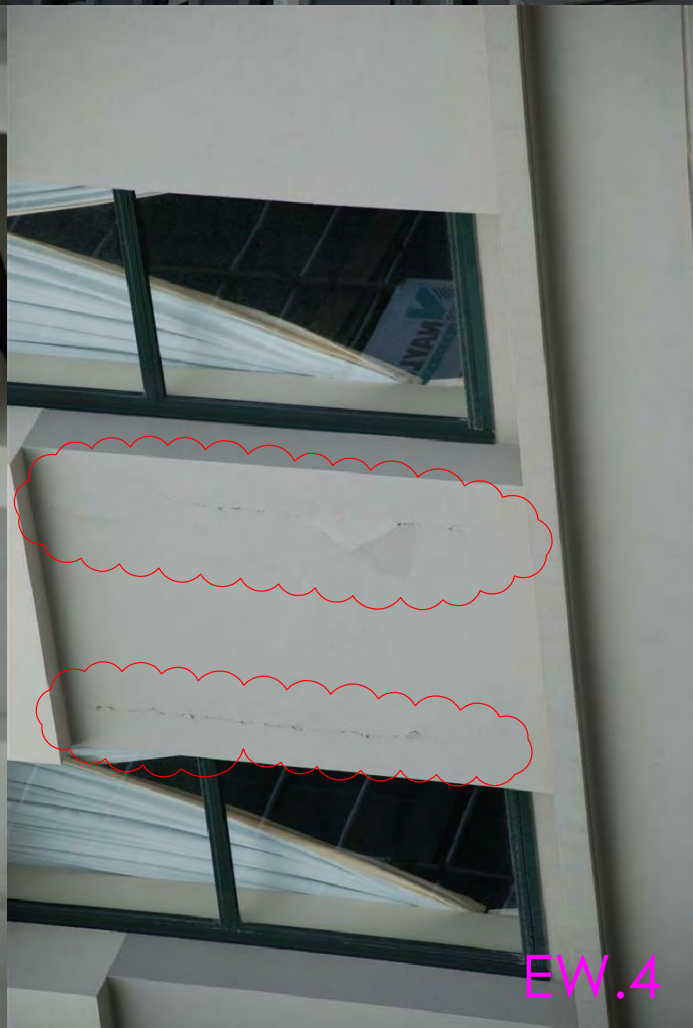
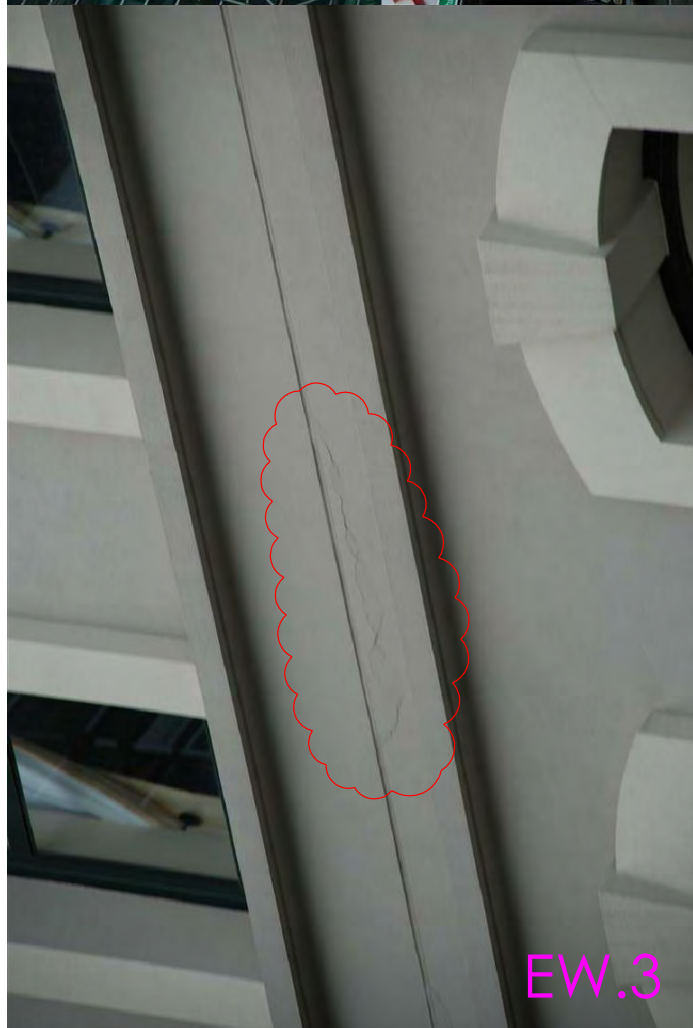








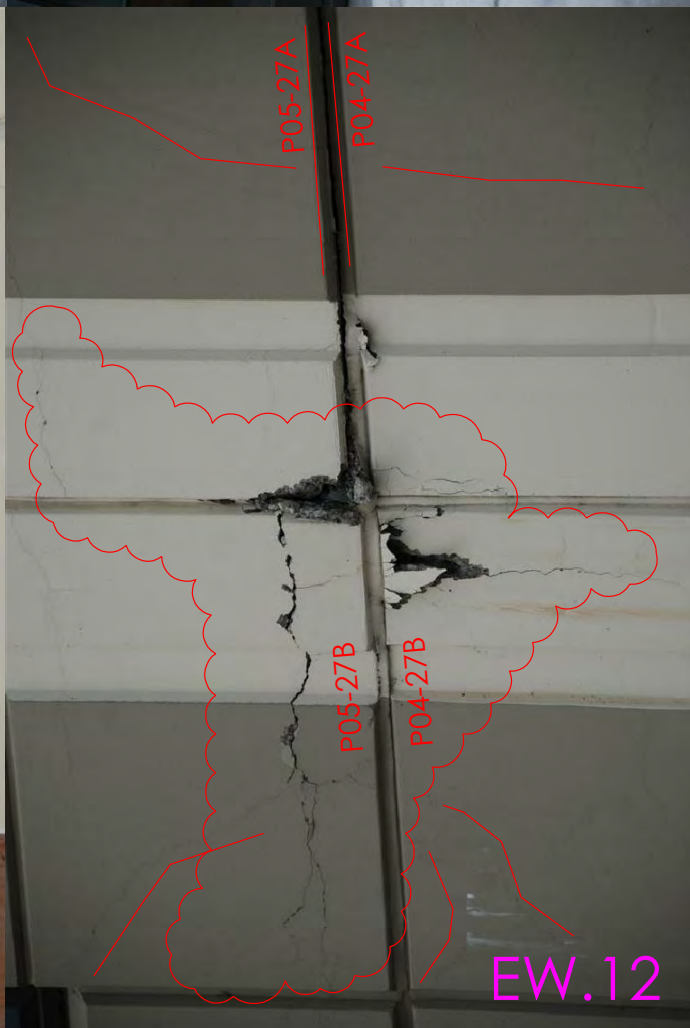


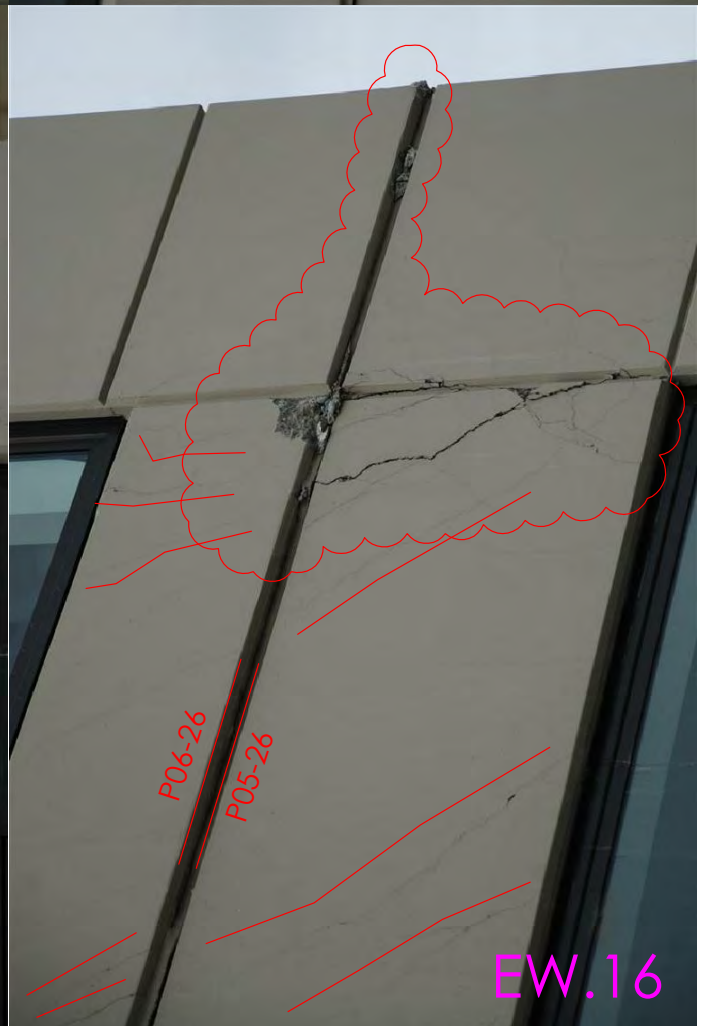
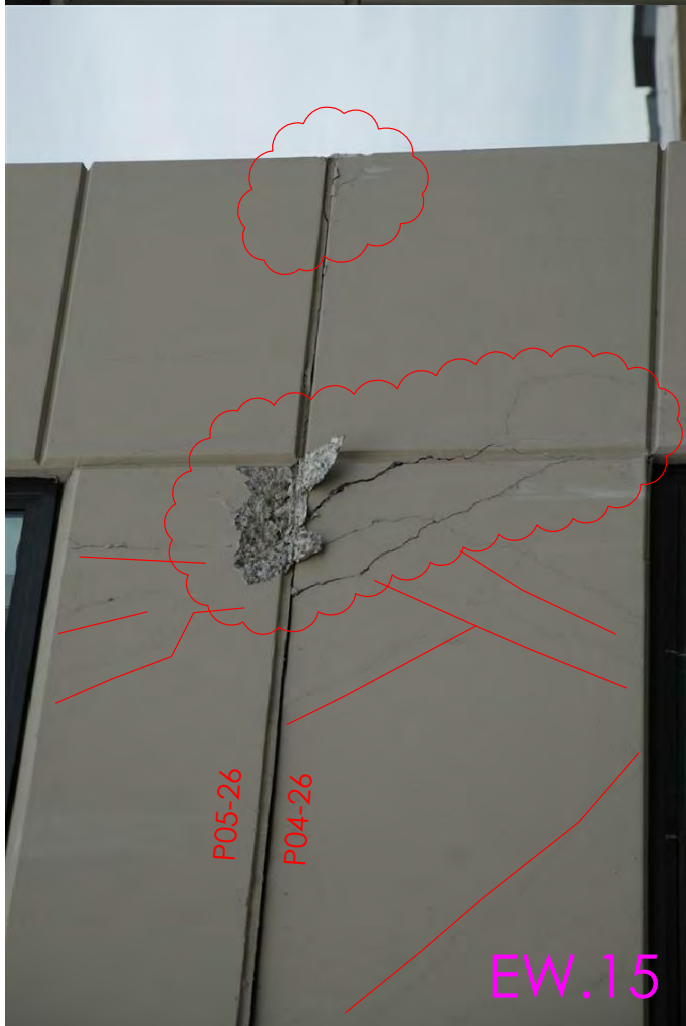
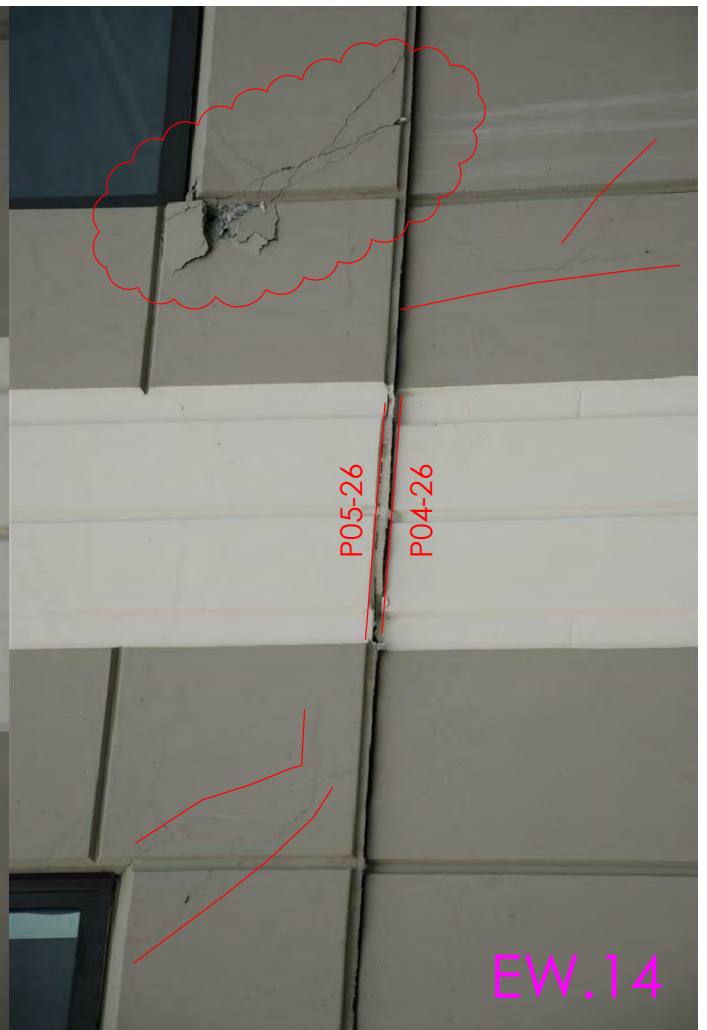
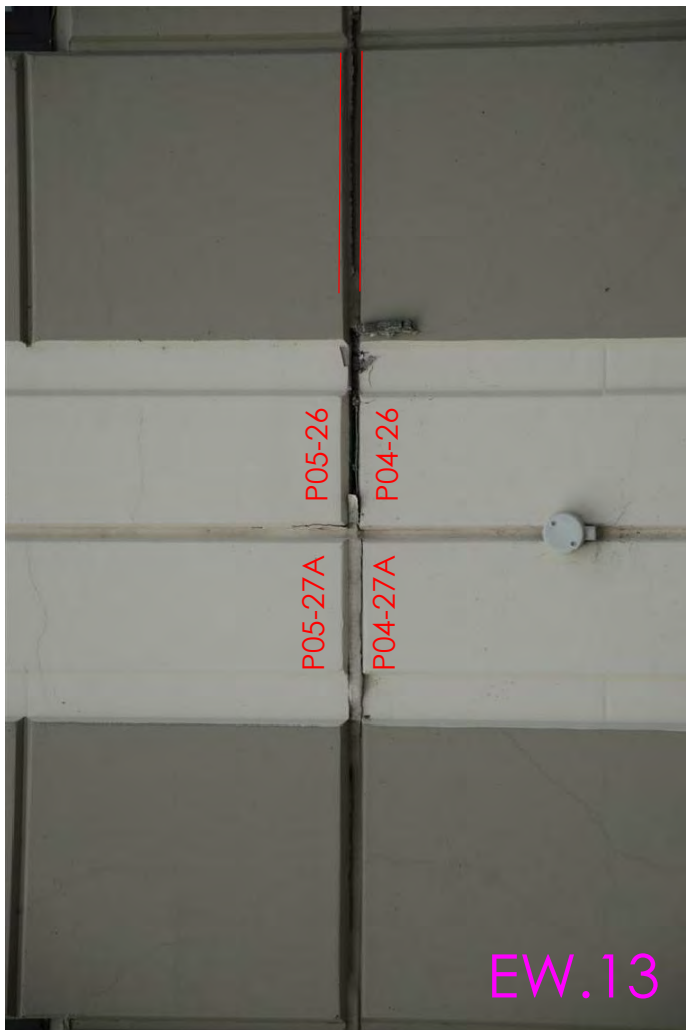




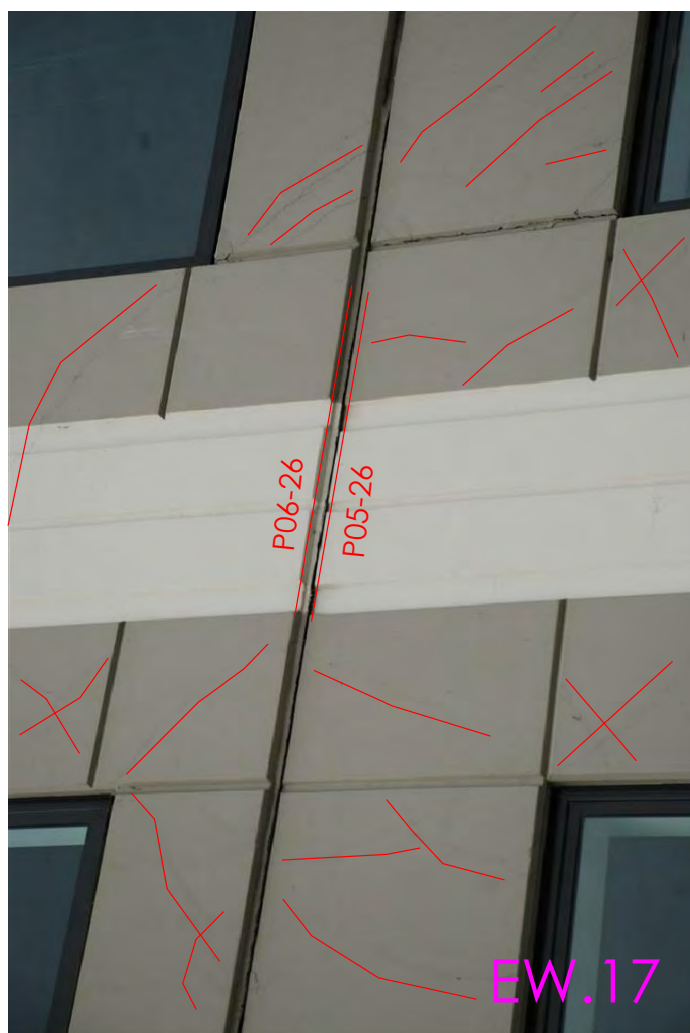


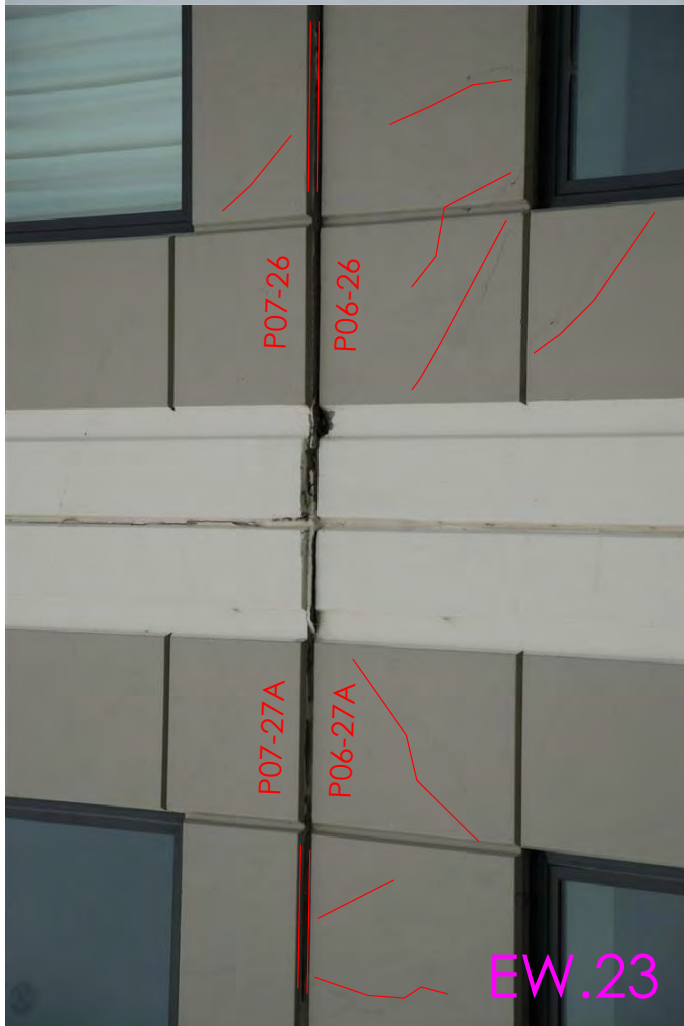
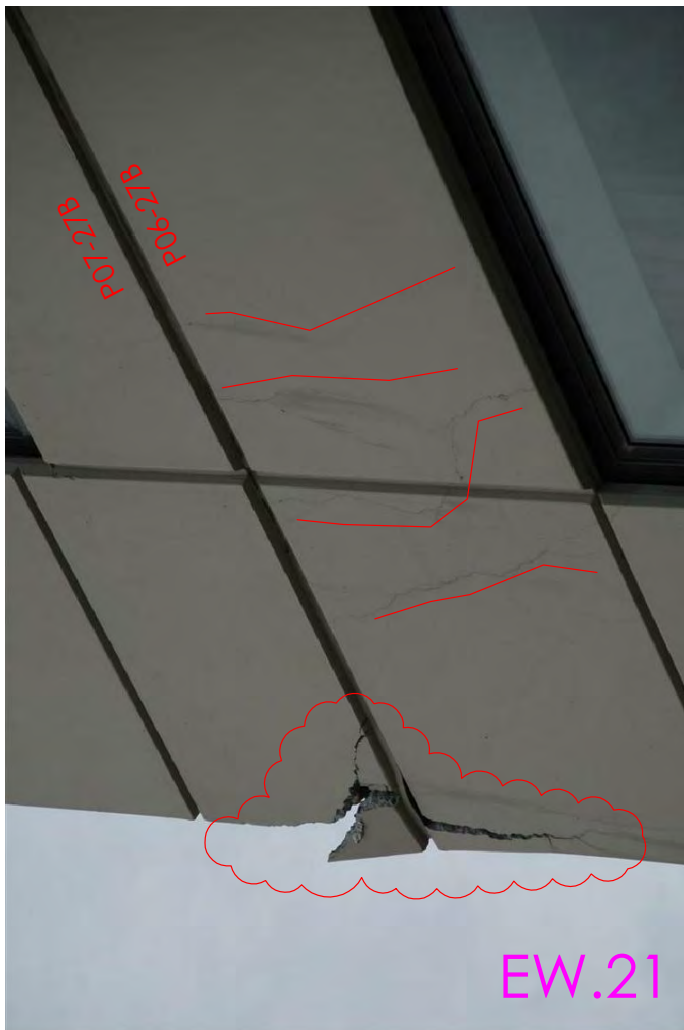




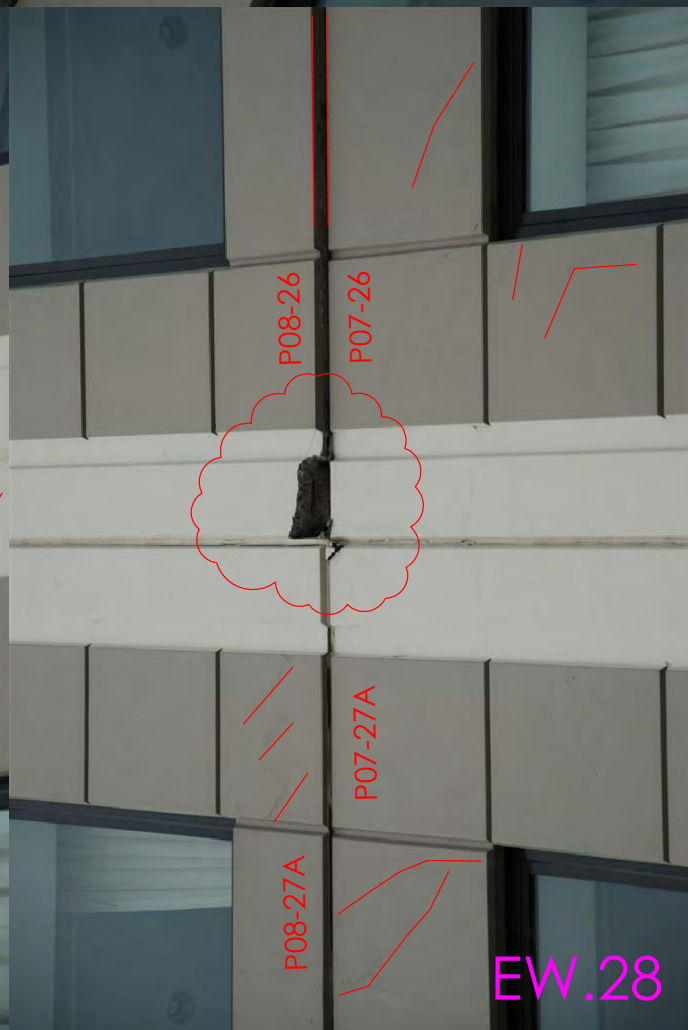


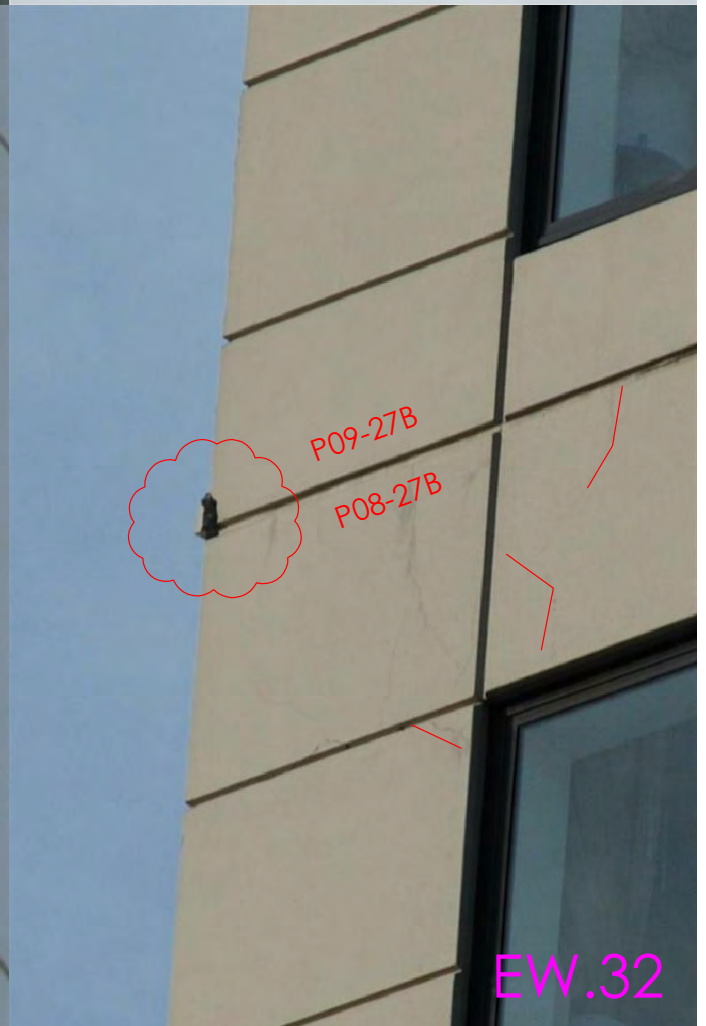
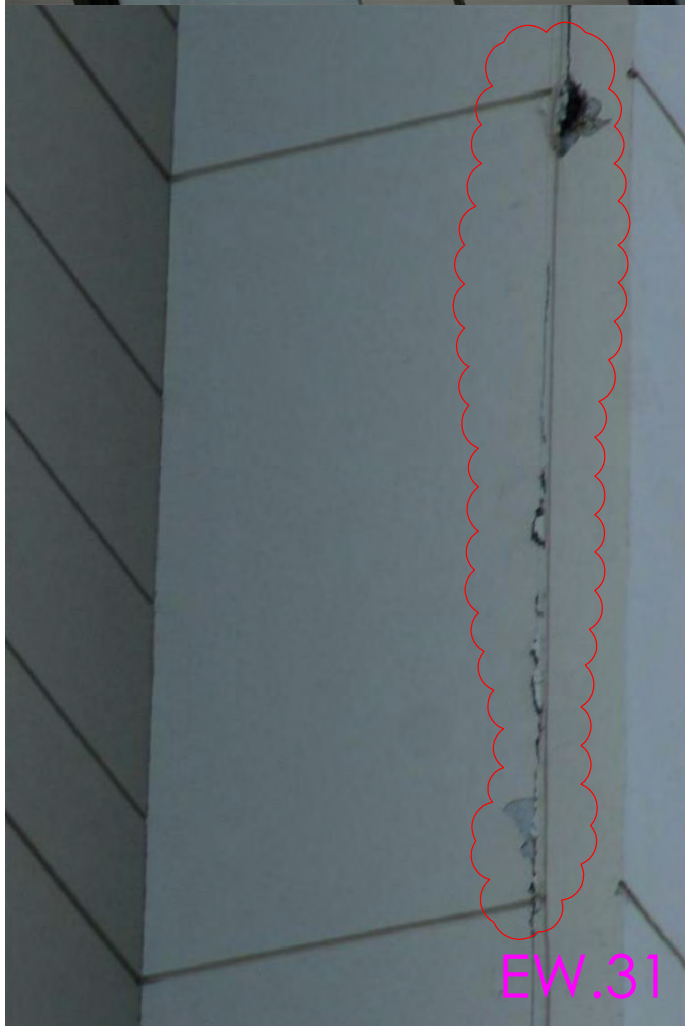




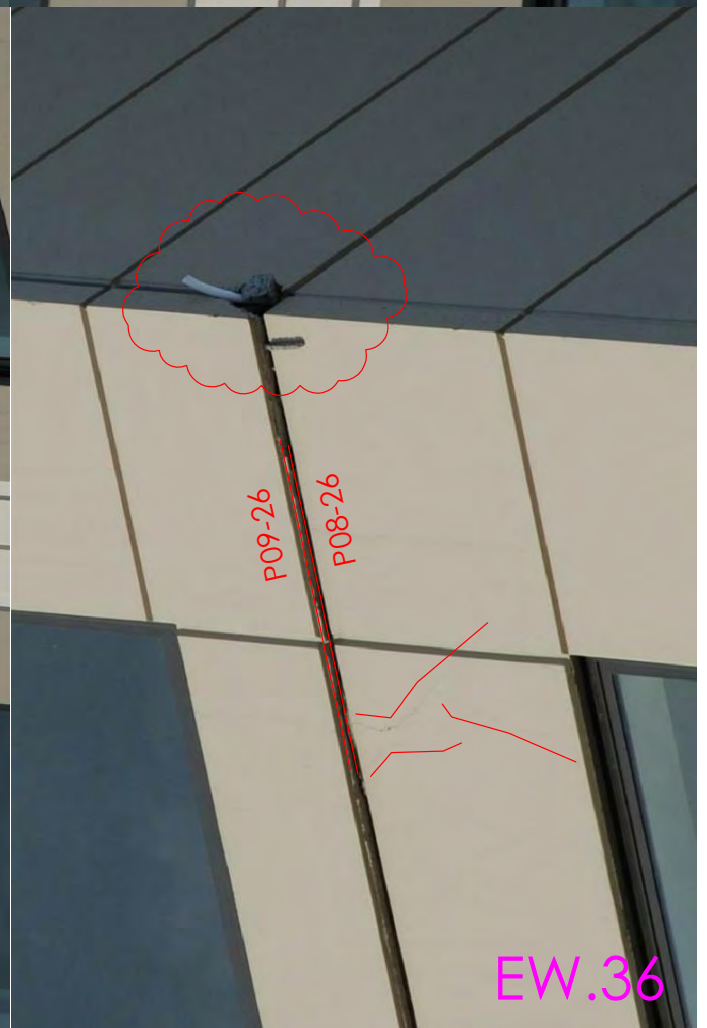
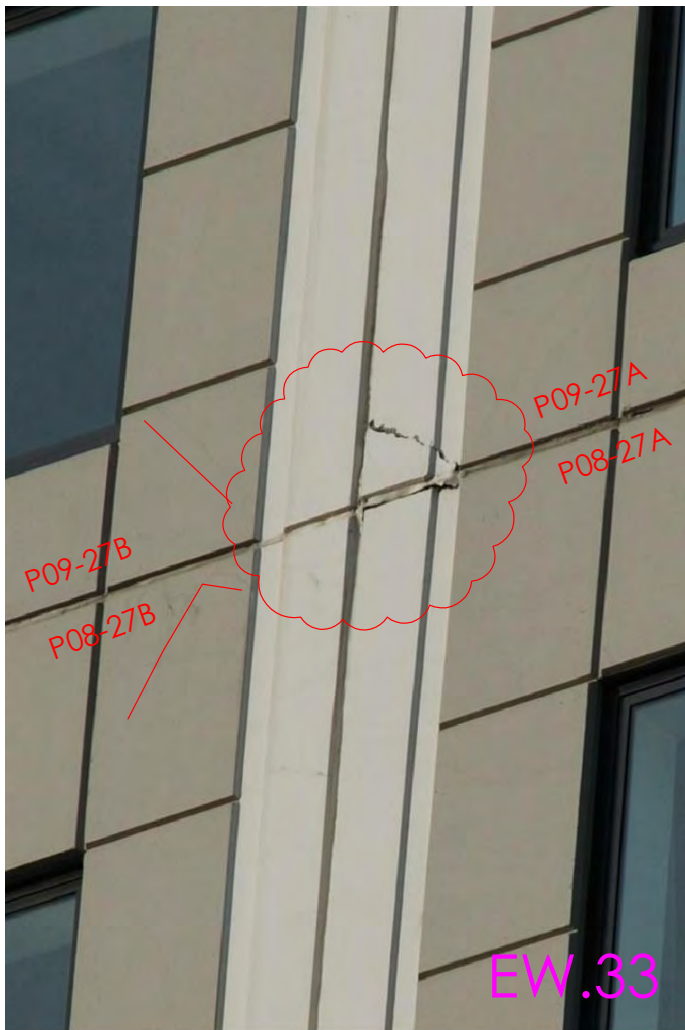


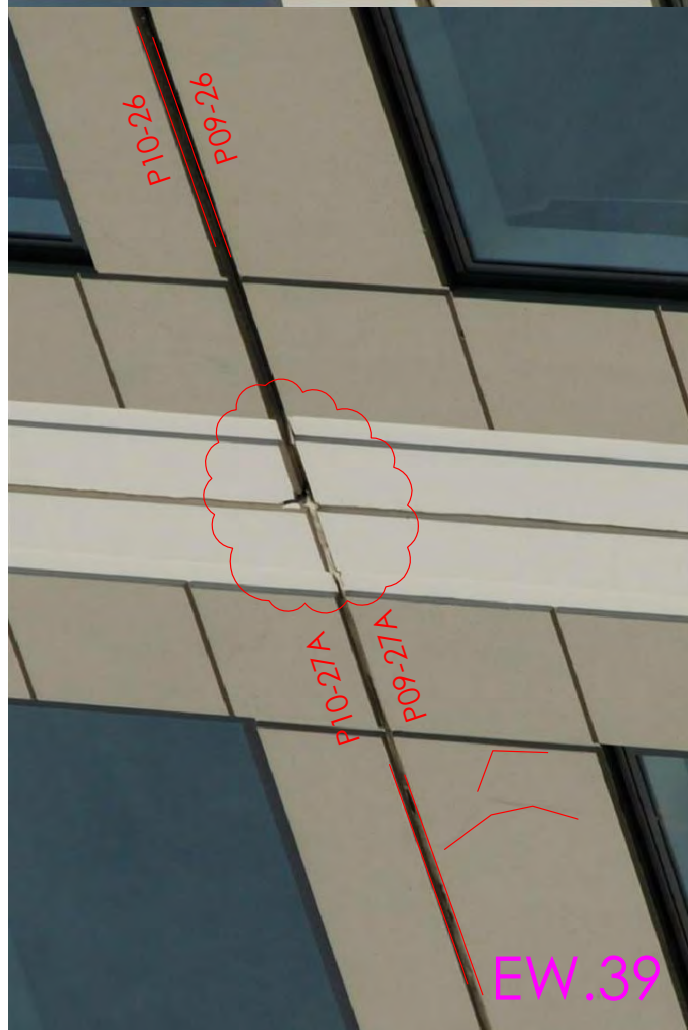




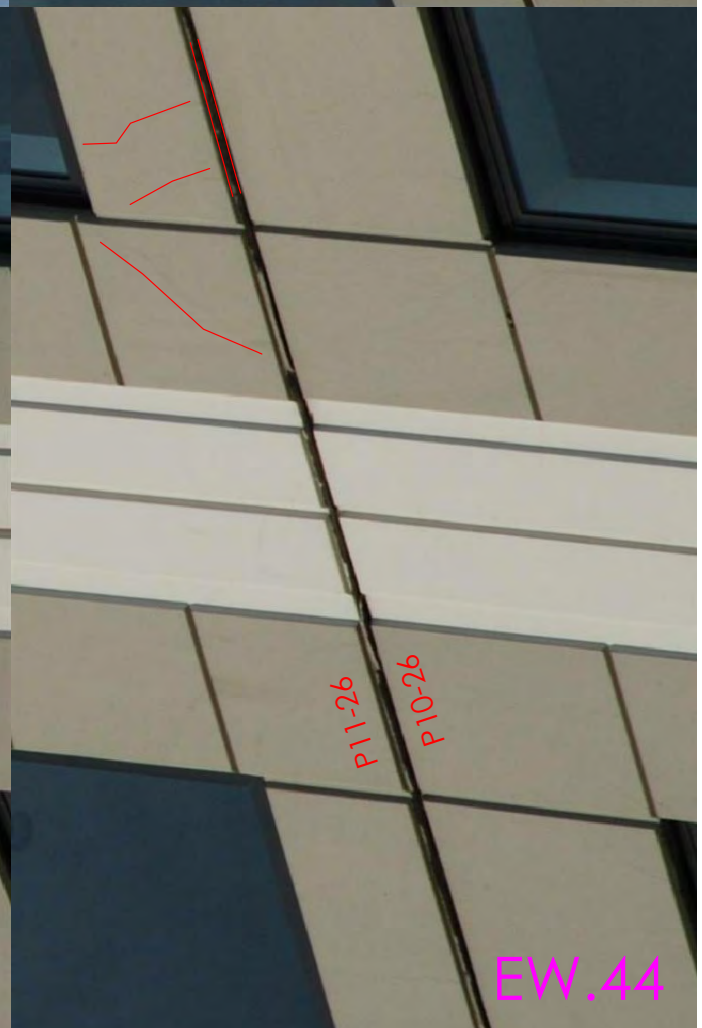
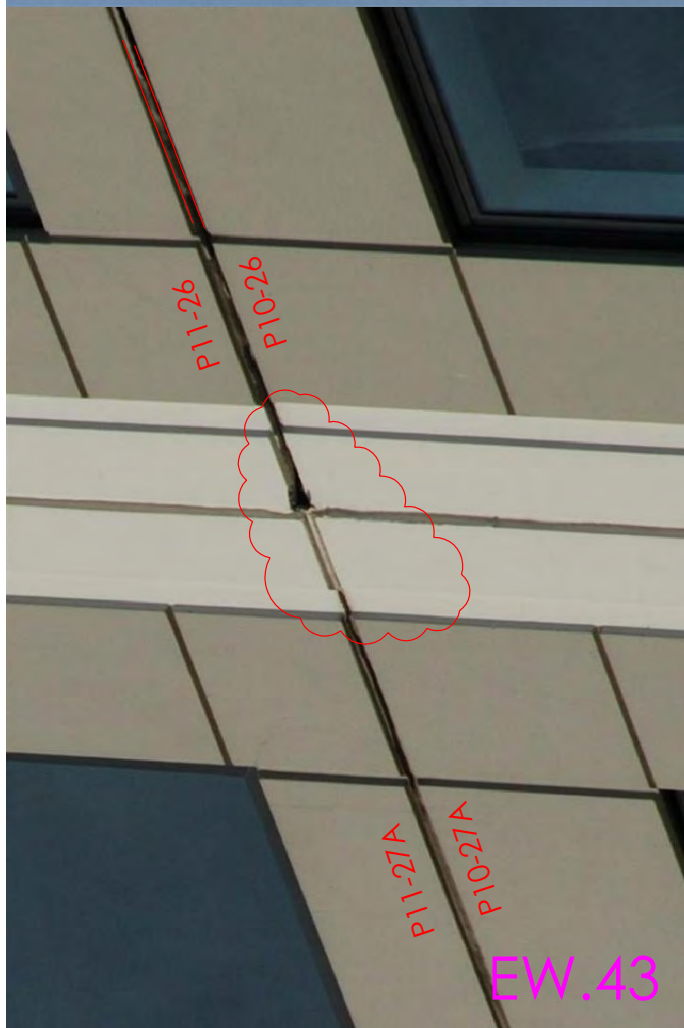


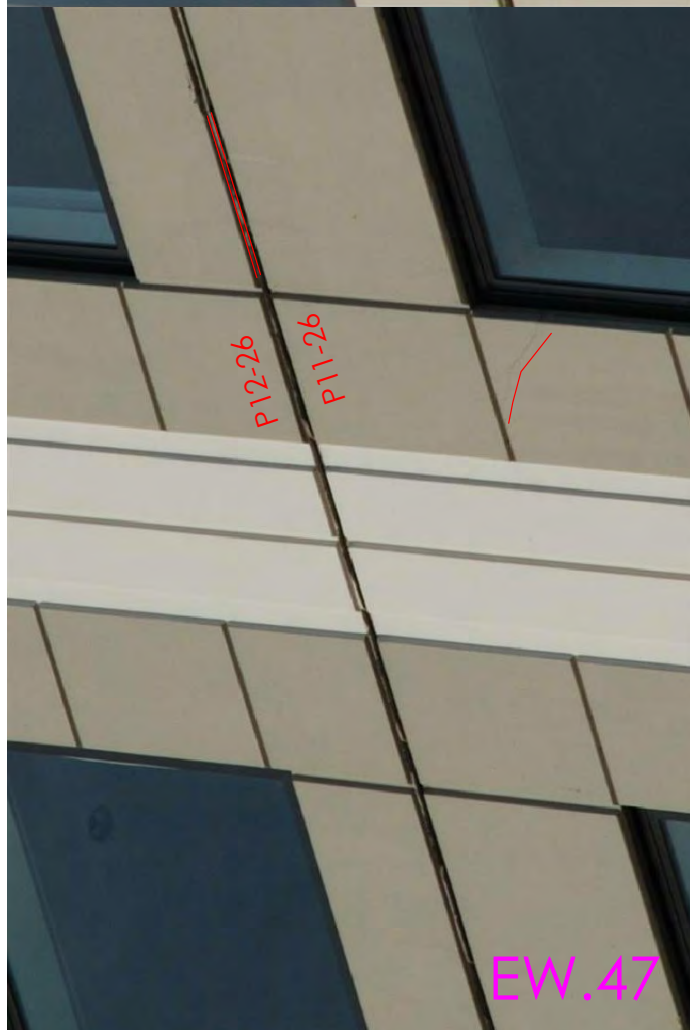
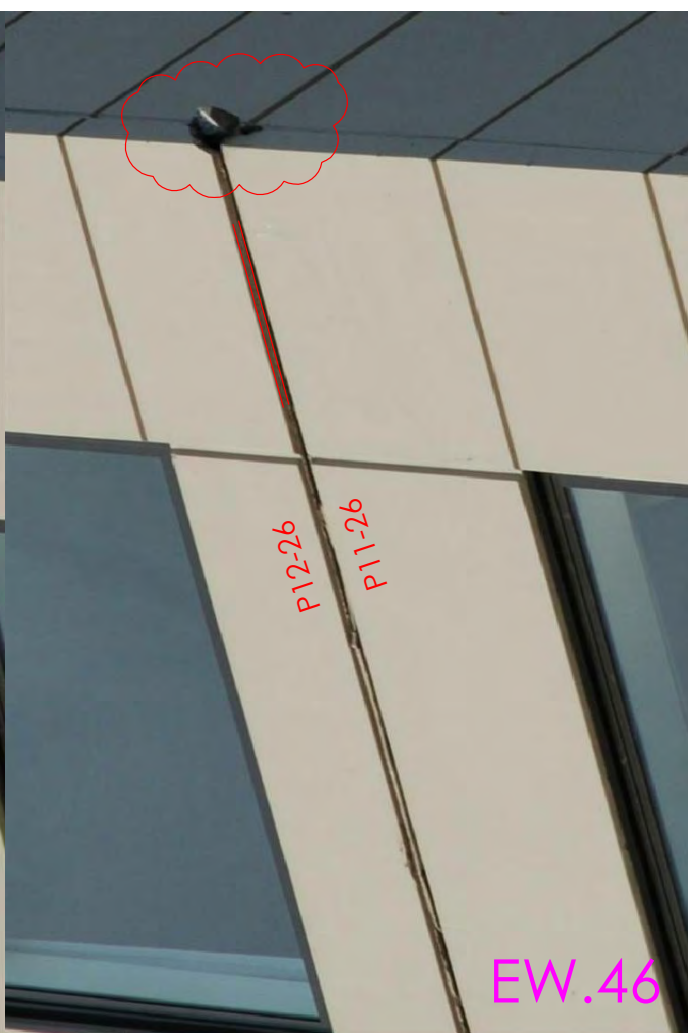
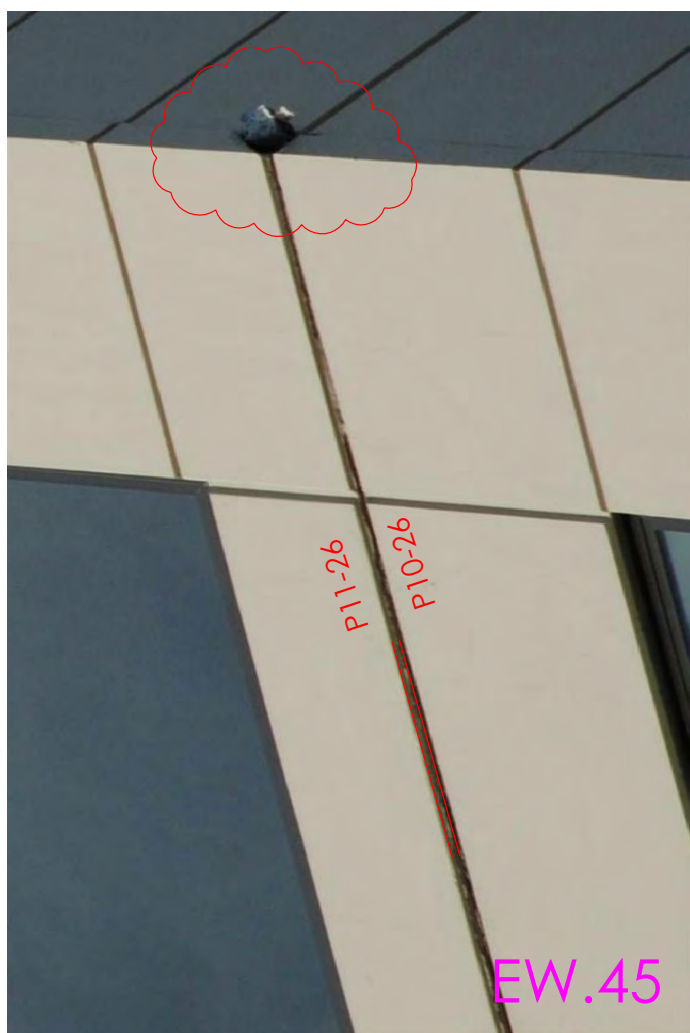










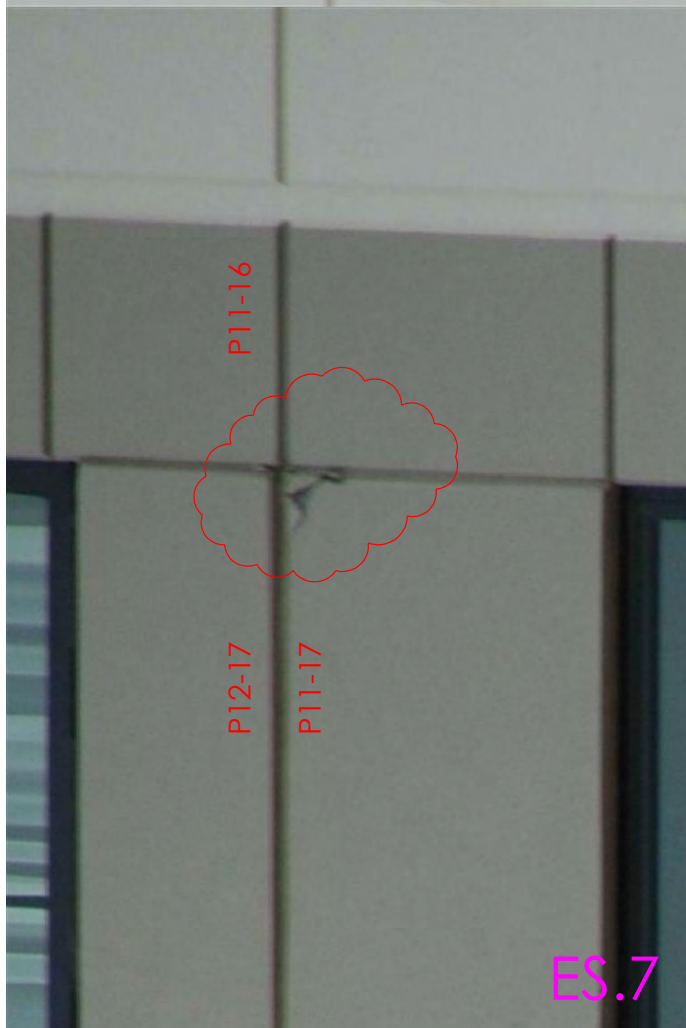


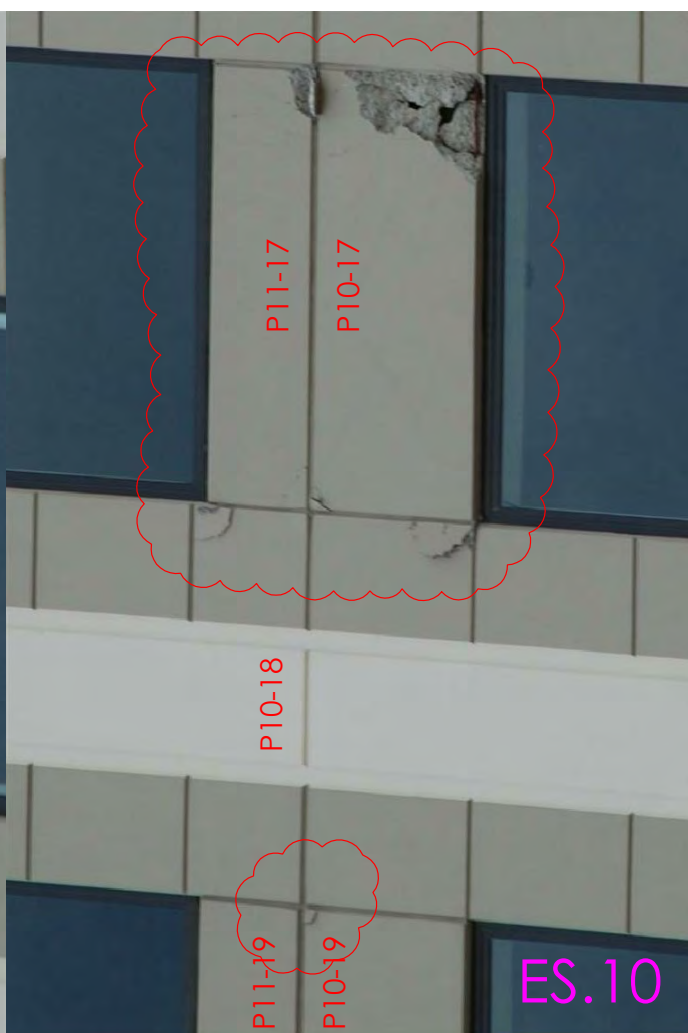




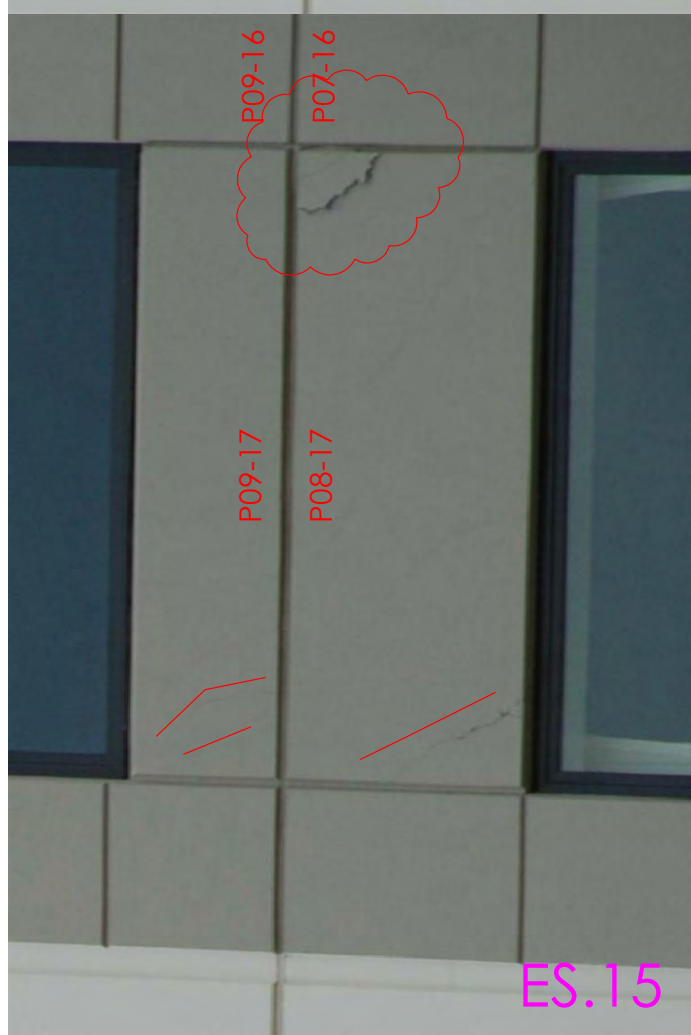
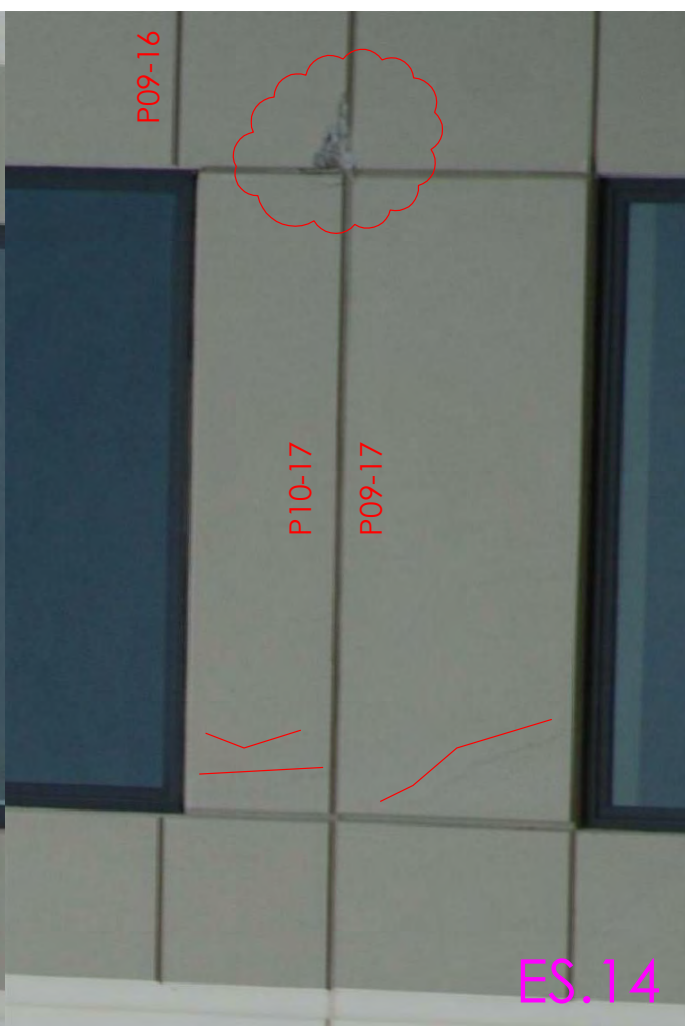






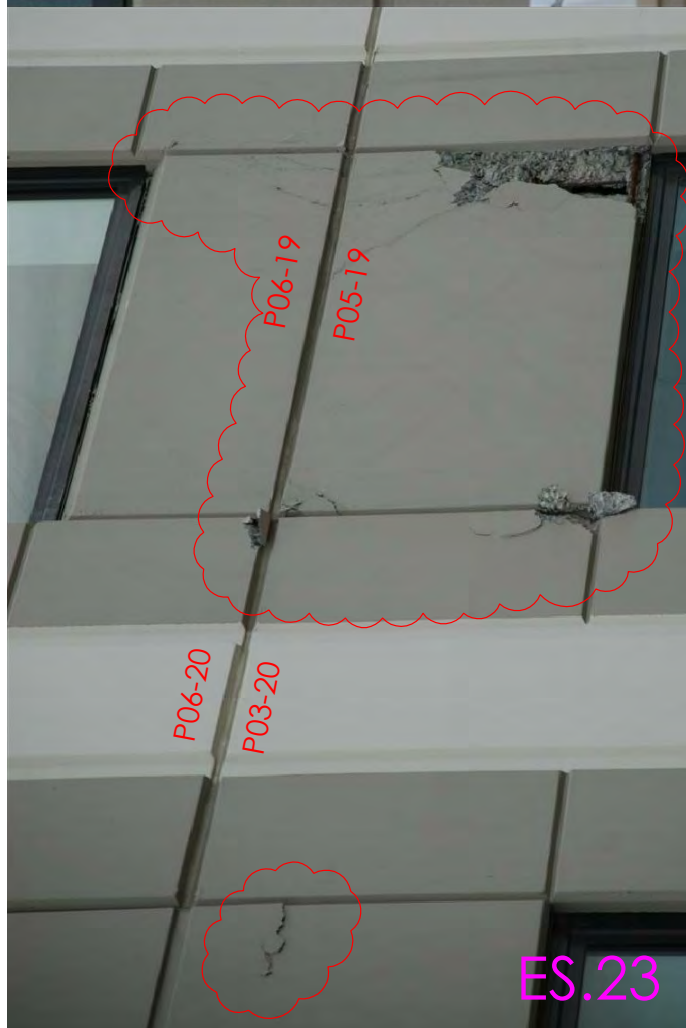
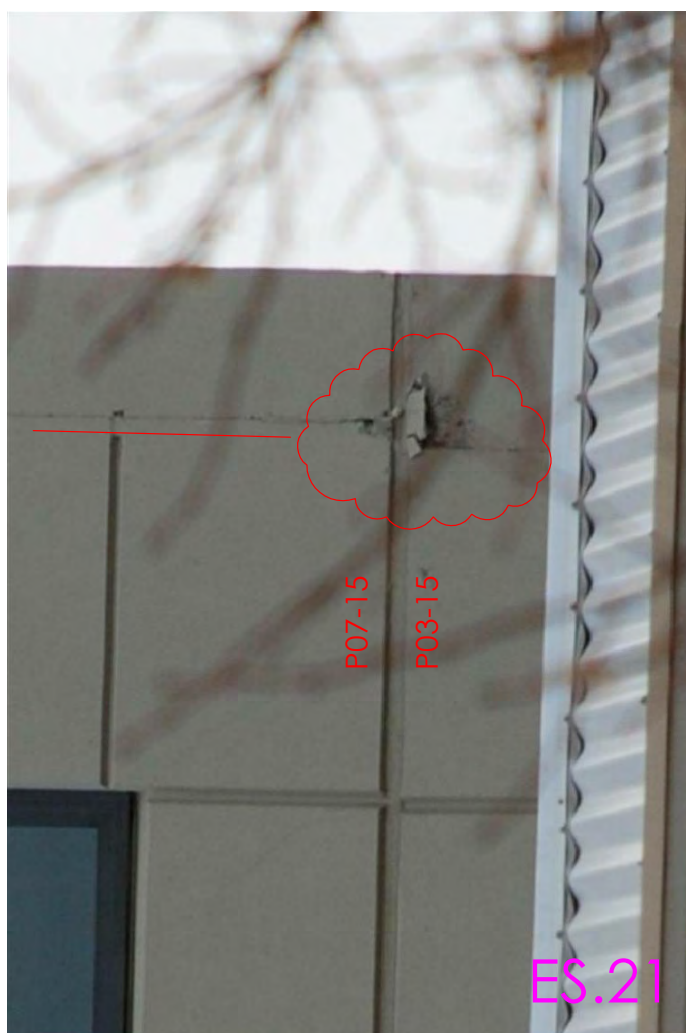


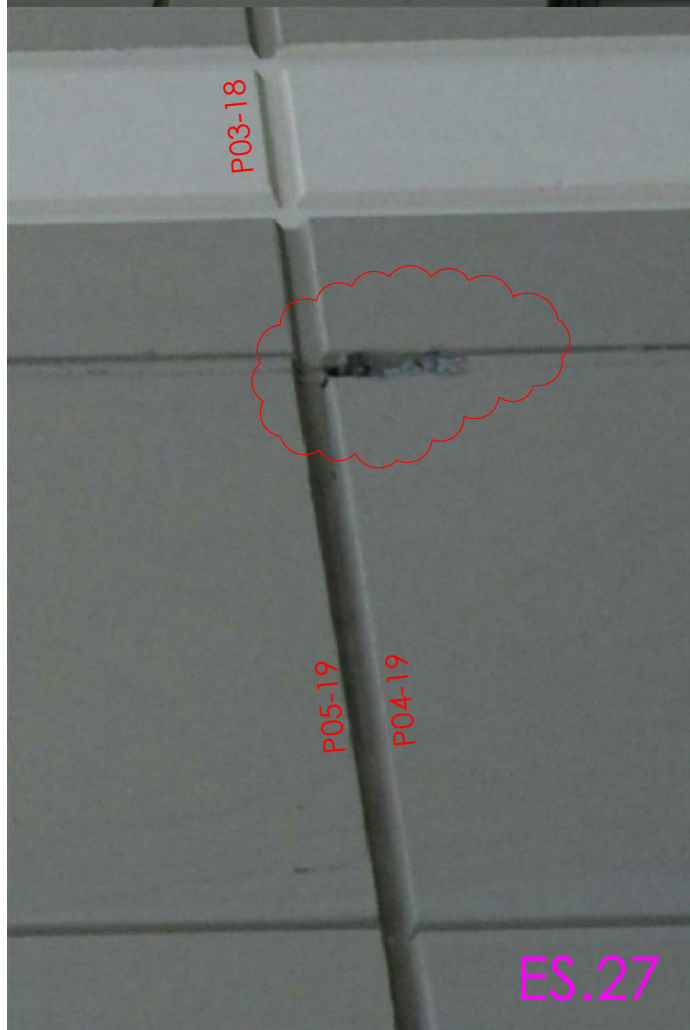
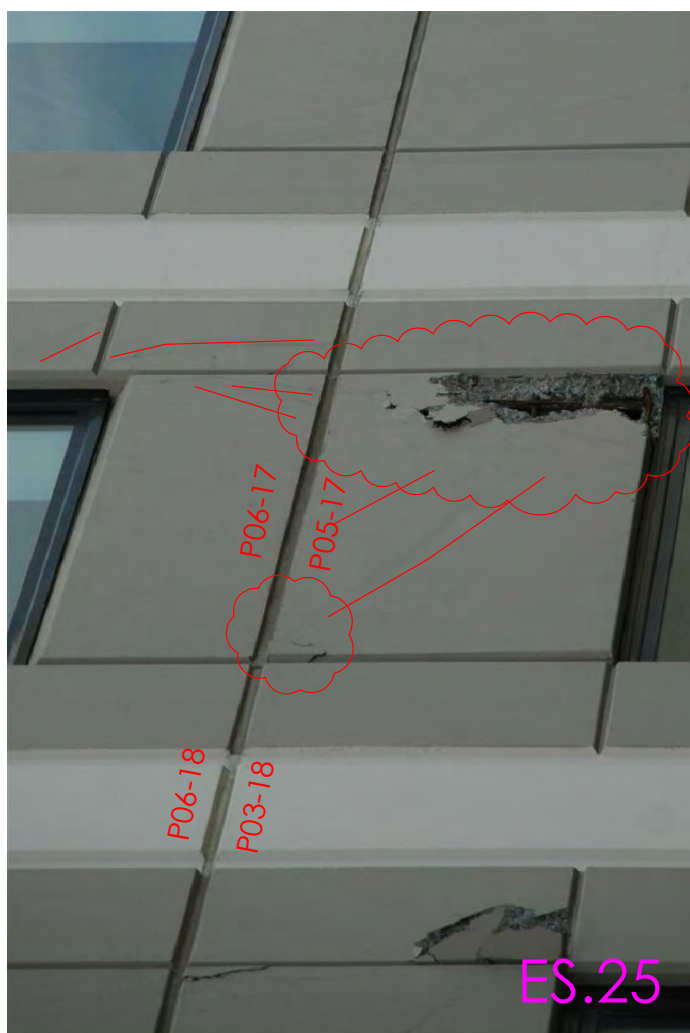




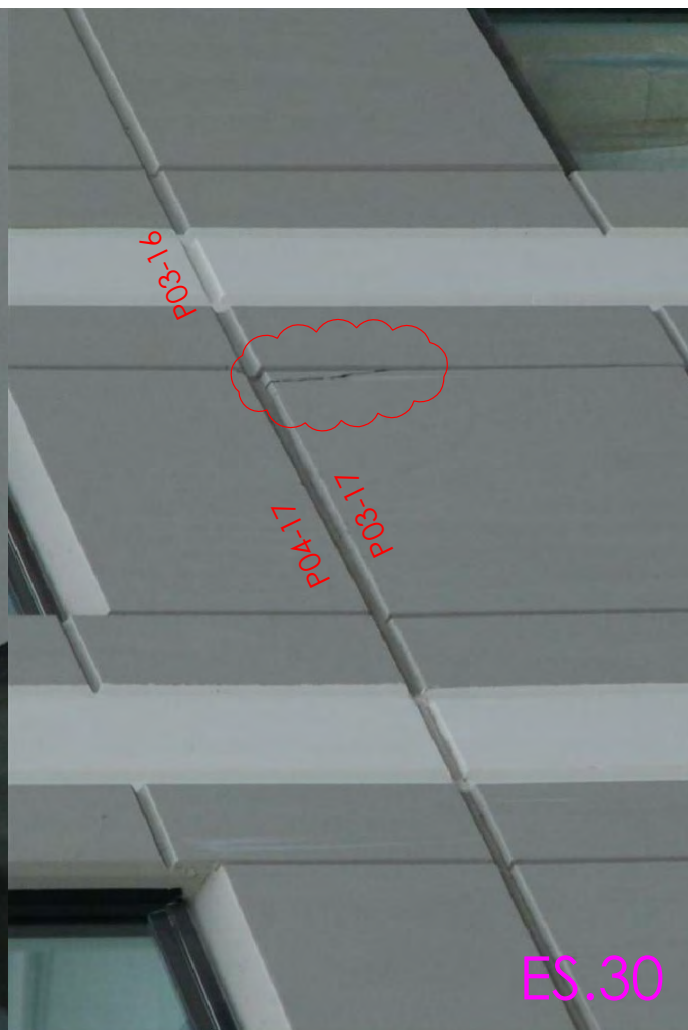












# APPENDIX E

## Structural Drawings





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CONTRACTOR TO VERIFY ALL DIMENSIONS ON SITE  
REFER TO ARCHITECT'S DRAWING FOR ALL SETOUTS

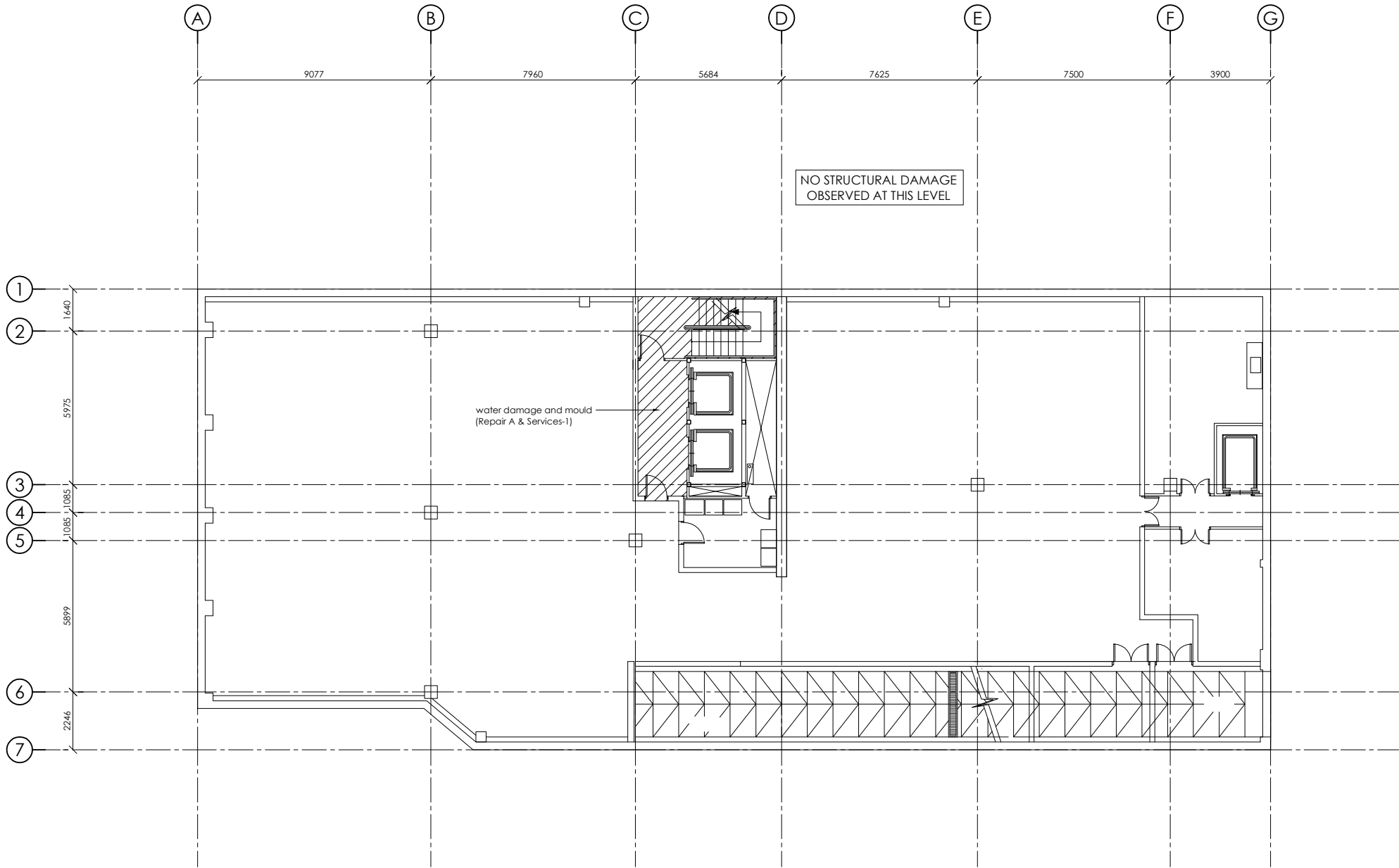
NOTES :

These drawings detail only the major areas of repair work required to the structure following the 22nd February 2011 earthquake and subsequent aftershocks up to the date of inspections in July 2011.

These drawings must be read in conjunction with the remainder of the report.

Areas of repair work to floor areas are shown indicative only and the extent shall be confirmed on site following removal of wall linings/floor coverings etc.

Any discrepancies shall be referred to Lewis Bradford Consulting Engineers for resolution before proceeding with work.



BASEMENT FLOOR PLAN  
1:100

1	23/08/11	REPORT ISSUE	GPW
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PROJECT:

NOVOTEL  
CATHEDRAL SQUARE

DRAWING TITLE:

BASEMENT FLOOR PLAN

DRAWN: GPW	SCALE:	
ENGINEER: AJW	1:100 @ A1	
CHECKED: CBL	1:200 @ A3	
FILE: 110170	DRAWING NO. S1-1	REV. 1

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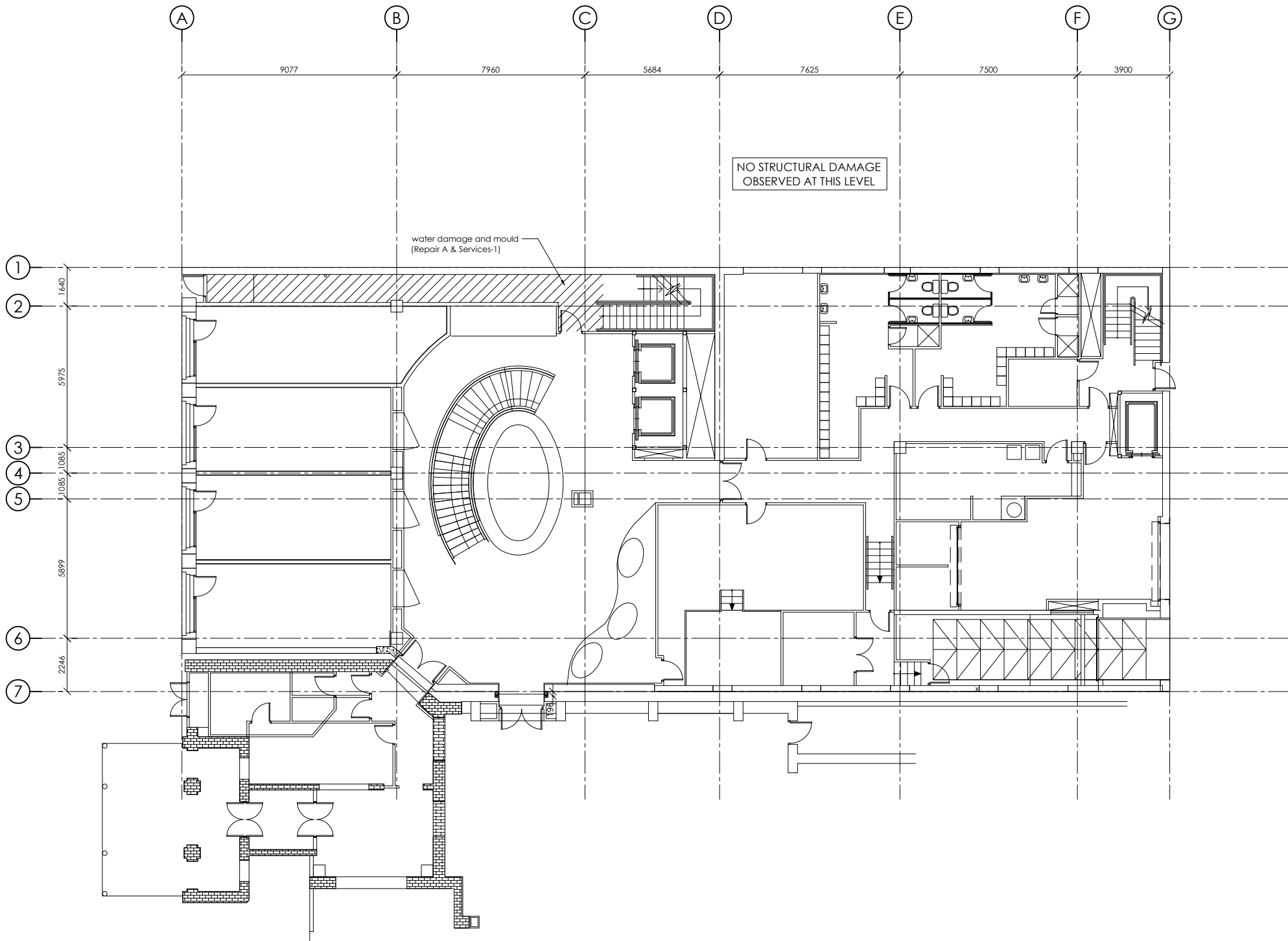
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GROUND FLOOR PLAN  
1:100

1	23/08/11	REPORT ISSUE	GPW
REV.	DATE	AMENDMENT	BY

ARCHITECT:



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CONSULTING ENGINEERS

PROJECT:

NOVOTEL  
CATHEDRAL SQUARE

DRAWING TITLE:

GROUND FLOOR PLAN

DRAWN: GPW	SCALE:	
ENGINEER: AJW	1:100 @ A1	
CHECKED: CBL	1:200 @ A3	
FILE: 110170	DRAWING NO. S2-1	REV. 1

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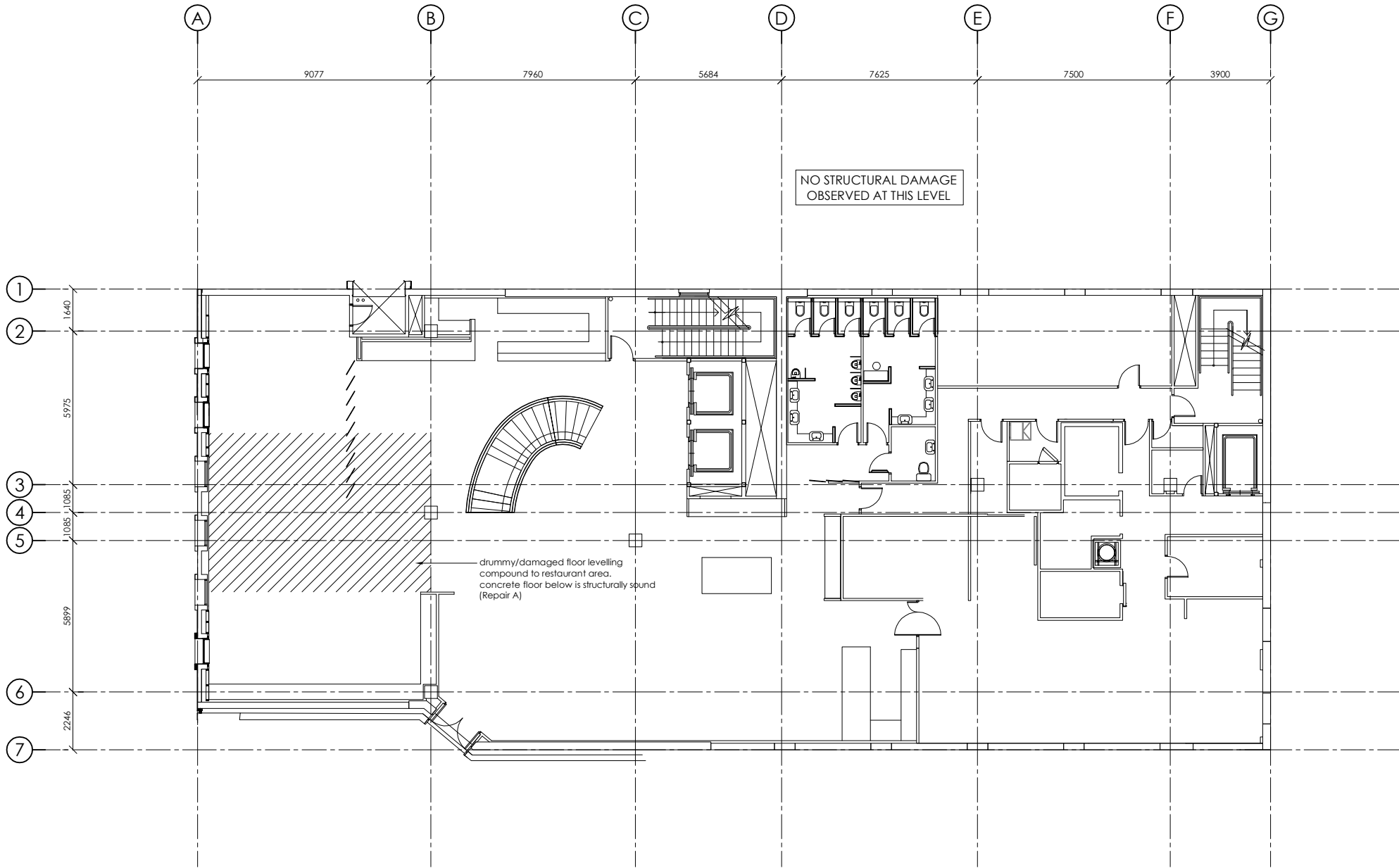
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LEVEL 1 FLOOR PLAN  
1:100

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ARCHITECT:



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CONSULTING ENGINEERS

PROJECT:

NOVOTEL  
CATHEDRAL SQUARE

DRAWING TITLE:

LEVEL 1 FLOOR PLAN

DRAWN: GPW	SCALE:	
ENGINEER: AJW	1:100 @ A1	
CHECKED: CBL	1:200 @ A3	
FILE: 110170	DRAWING NO. S3-1	REV. 1

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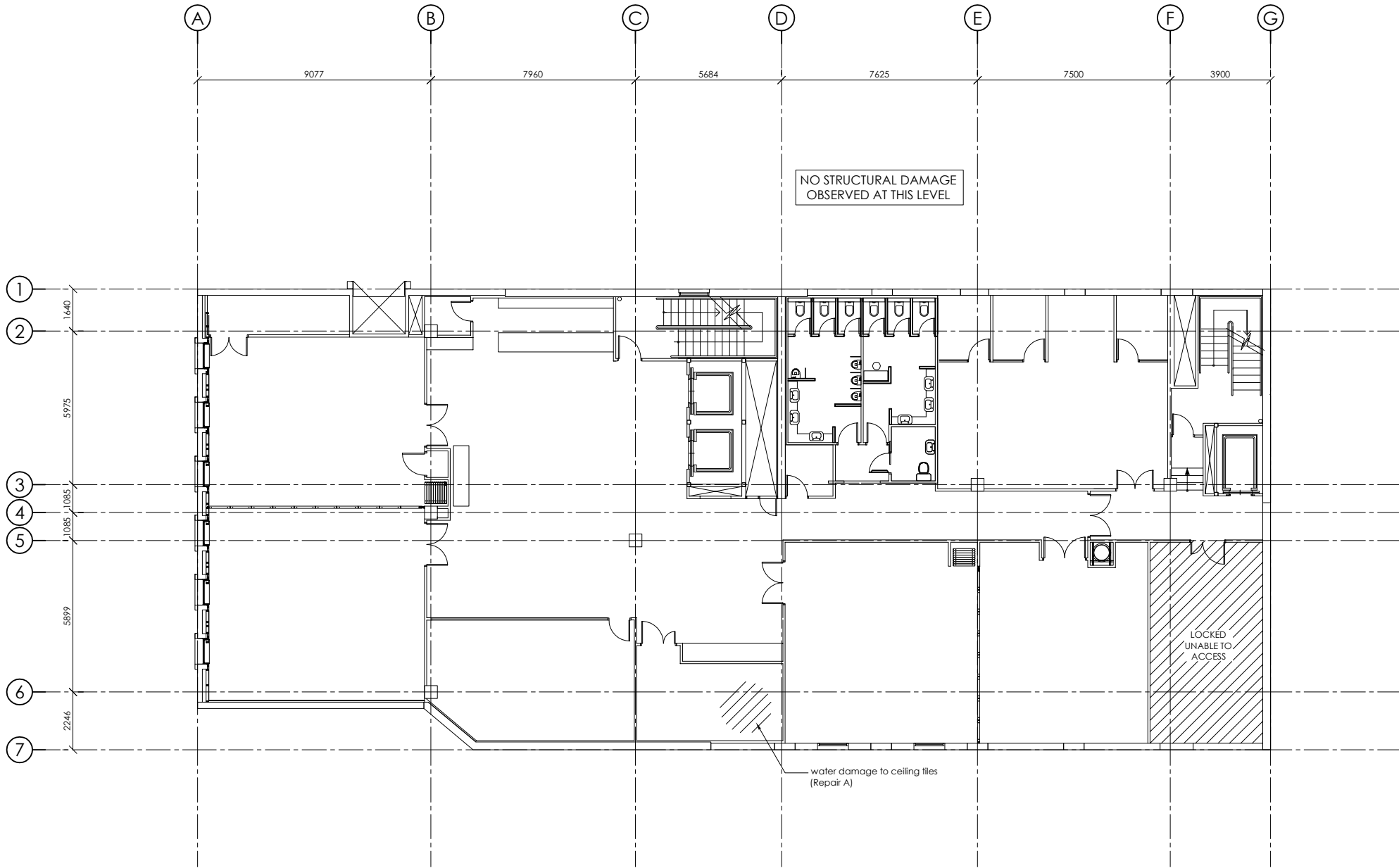
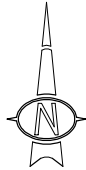
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LEVEL 2 FLOOR PLAN  
1:100

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PROJECT:

NOVOTEL  
CATHEDRAL SQUARE

DRAWING TITLE:

LEVEL 2 FLOOR PLAN

DRAWN: GPW	SCALE:	
ENGINEER: AJW	1:100 @ A1	
CHECKED: CBL	1:200 @ A3	
FILE: 110170	DRAWING NO. S4-1	REV. 1

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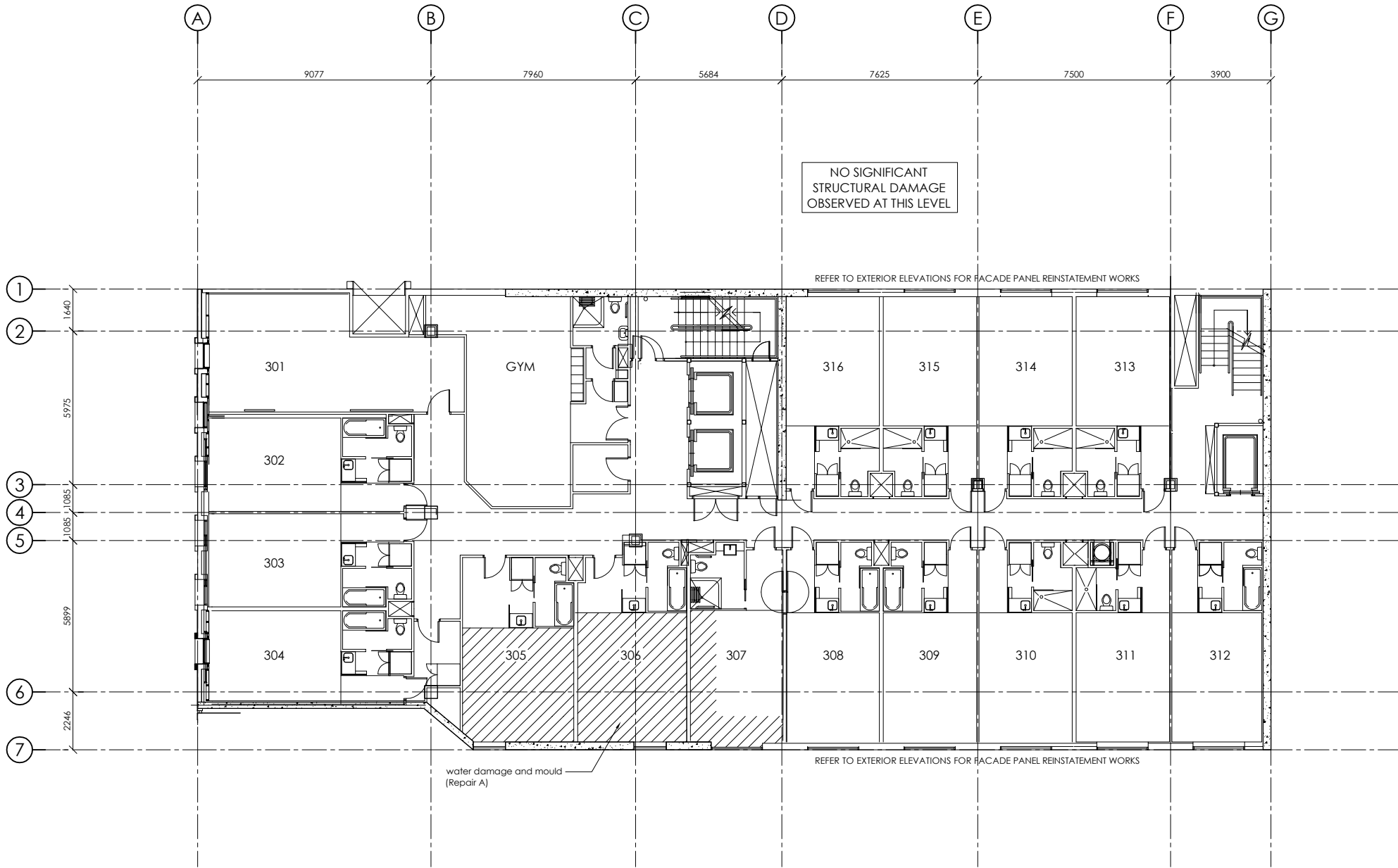
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LEVEL 3 FLOOR PLAN  
1:100

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REV.	DATE	AMENDMENT	BY

ARCHITECT:



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PROJECT:

NOVOTEL  
CATHEDRAL SQUARE

DRAWING TITLE:

LEVEL 3 FLOOR PLAN

DRAWN: GPW	SCALE:	
ENGINEER: AJW	1:100 @ A1	
CHECKED: CBL	1:200 @ A3	
FILE: 110170	DRAWING NO. S5-1	REV. 1

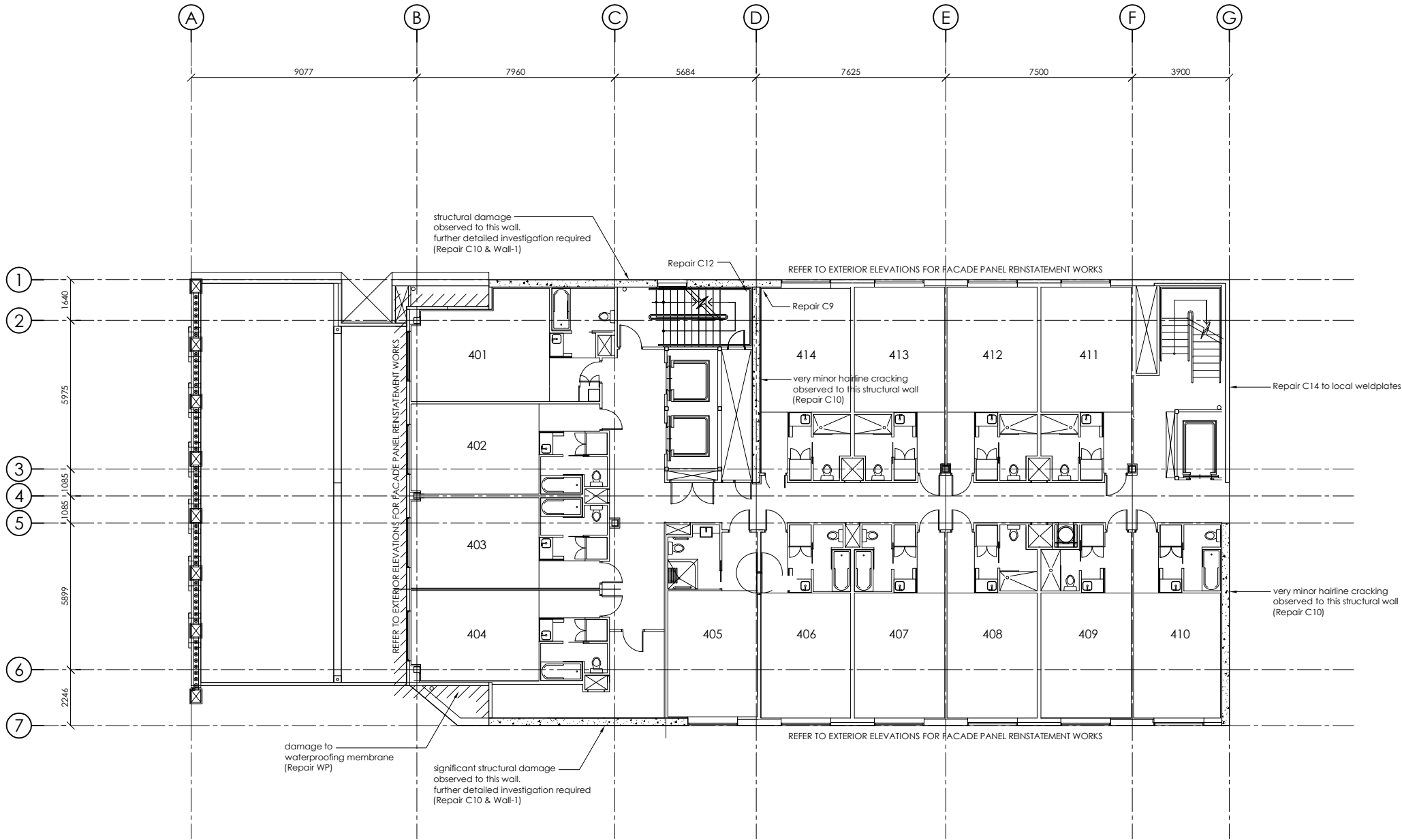
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LEVEL 4 FLOOR PLAN  
1:100

1	23/08/11	REPORT ISSUE	GPW
REV.	DATE	AMENDMENT	BY

ARCHITECT:



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CONSULTING ENGINEERS

PROJECT:

NOVOTEL  
CATHEDRAL SQUARE

DRAWING TITLE:

LEVEL 4 FLOOR PLAN

DRAWN: GPW	SCALE: 1:100 @ A1	
ENGINEER: AJW	1:200 @ A3	
CHECKED: CBL		
FILE: 110170	DRAWING NO. S6-1	REV. 1

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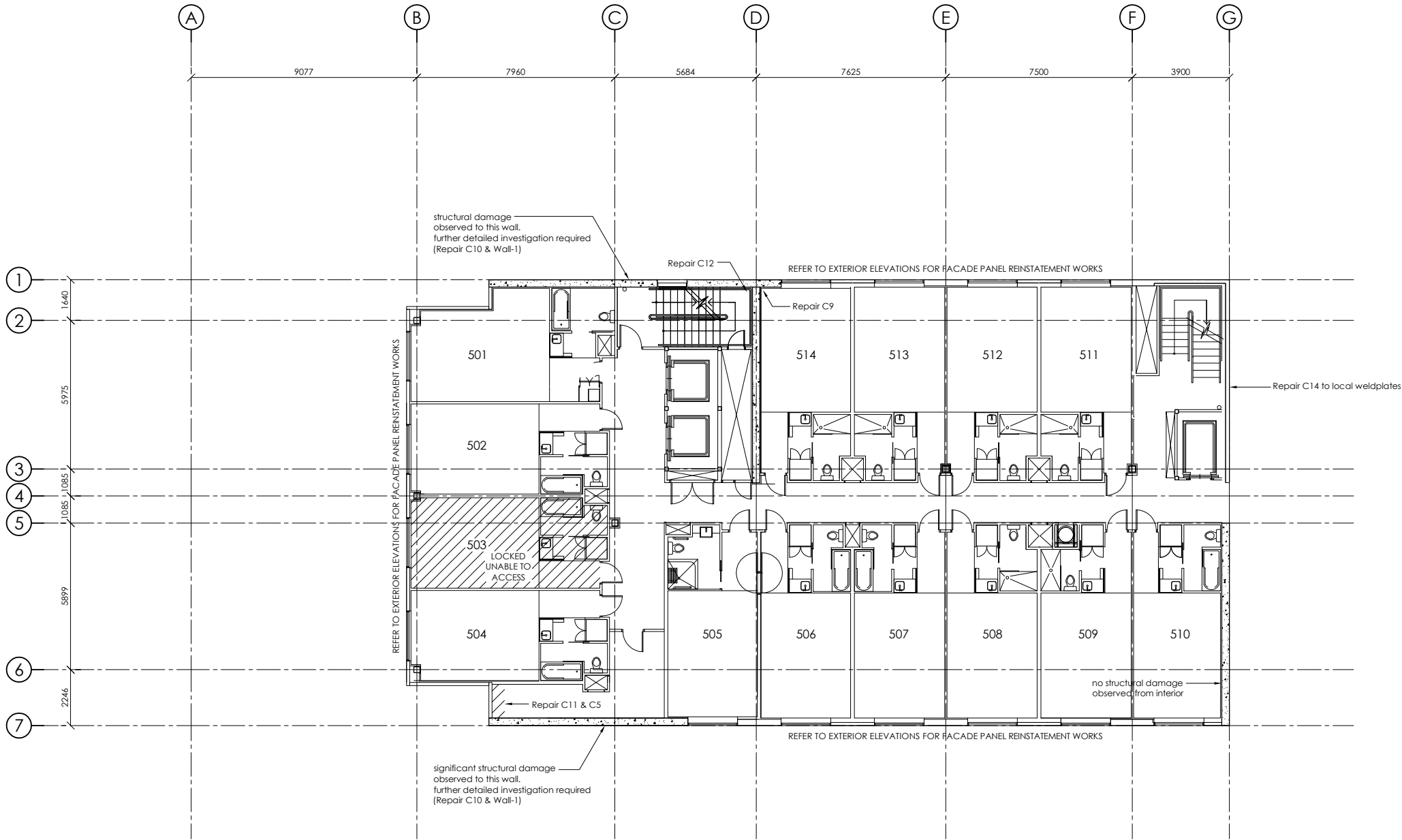
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LEVEL 5 FLOOR PLAN  
1:100

1	23/08/11	REPORT ISSUE	GPW
REV.	DATE	AMENDMENT	BY

ARCHITECT:



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PROJECT:

NOVOTEL  
CATHEDRAL SQUARE

DRAWING TITLE:

LEVEL 5 FLOOR PLAN

DRAWN: GPW	SCALE: 1:100 @ A1	
ENGINEER: AJW	1:200 @ A3	
CHECKED: GPW		
FILE: 110170	DRAWING NO. S7-1	REV. 1

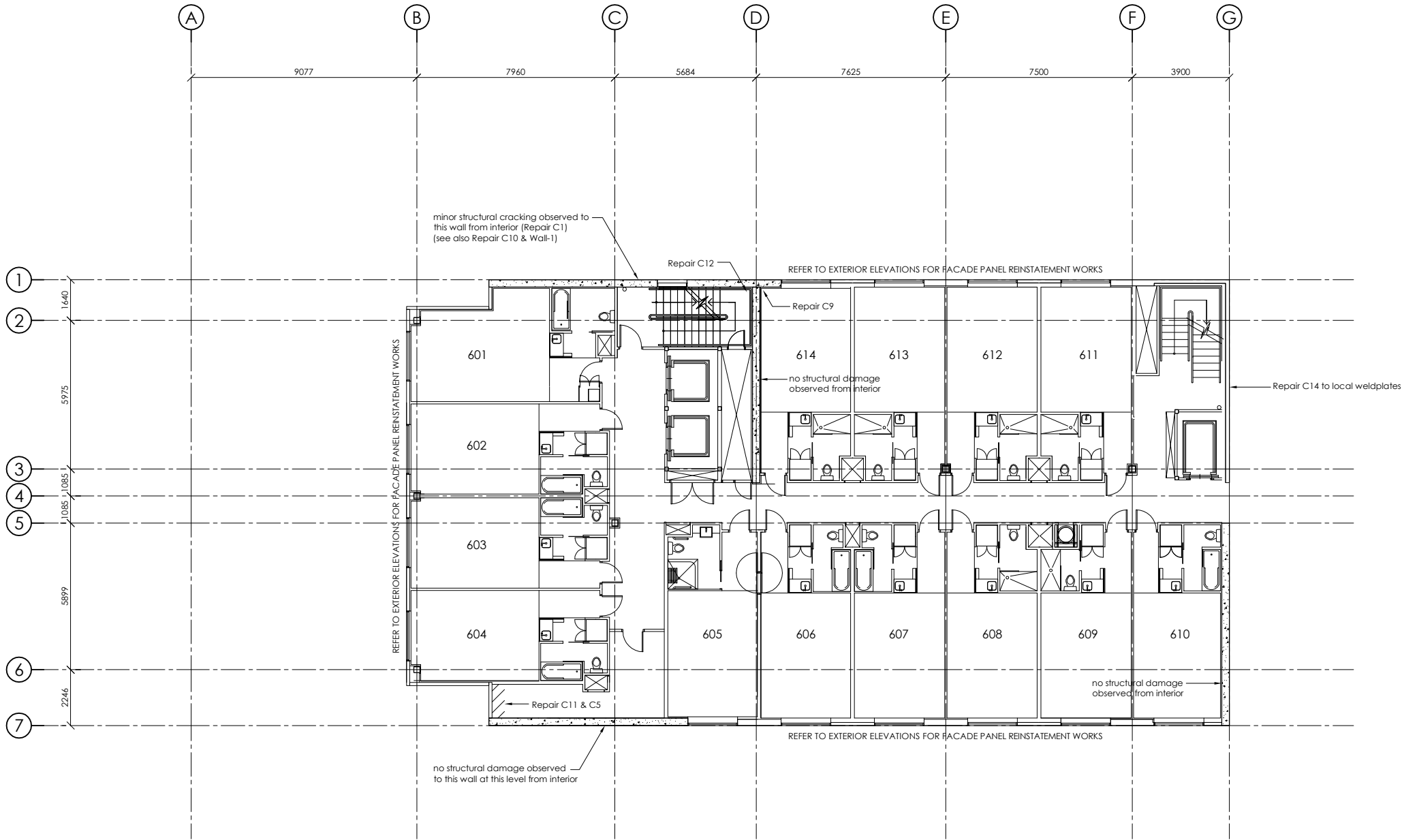
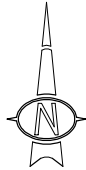
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LEVEL 6 FLOOR PLAN  
1:100

1	23/08/11	REPORT ISSUE	GPW
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PROJECT:

NOVOTEL  
CATHEDRAL SQUARE

DRAWING TITLE:

LEVEL 6 FLOOR PLAN

DRAWN: GPW	SCALE: 1:100 @ A1	
ENGINEER: AJW	1:200 @ A3	
CHECKED: CBL		
FILE: 110170	DRAWING NO. S8-1	REV. 1



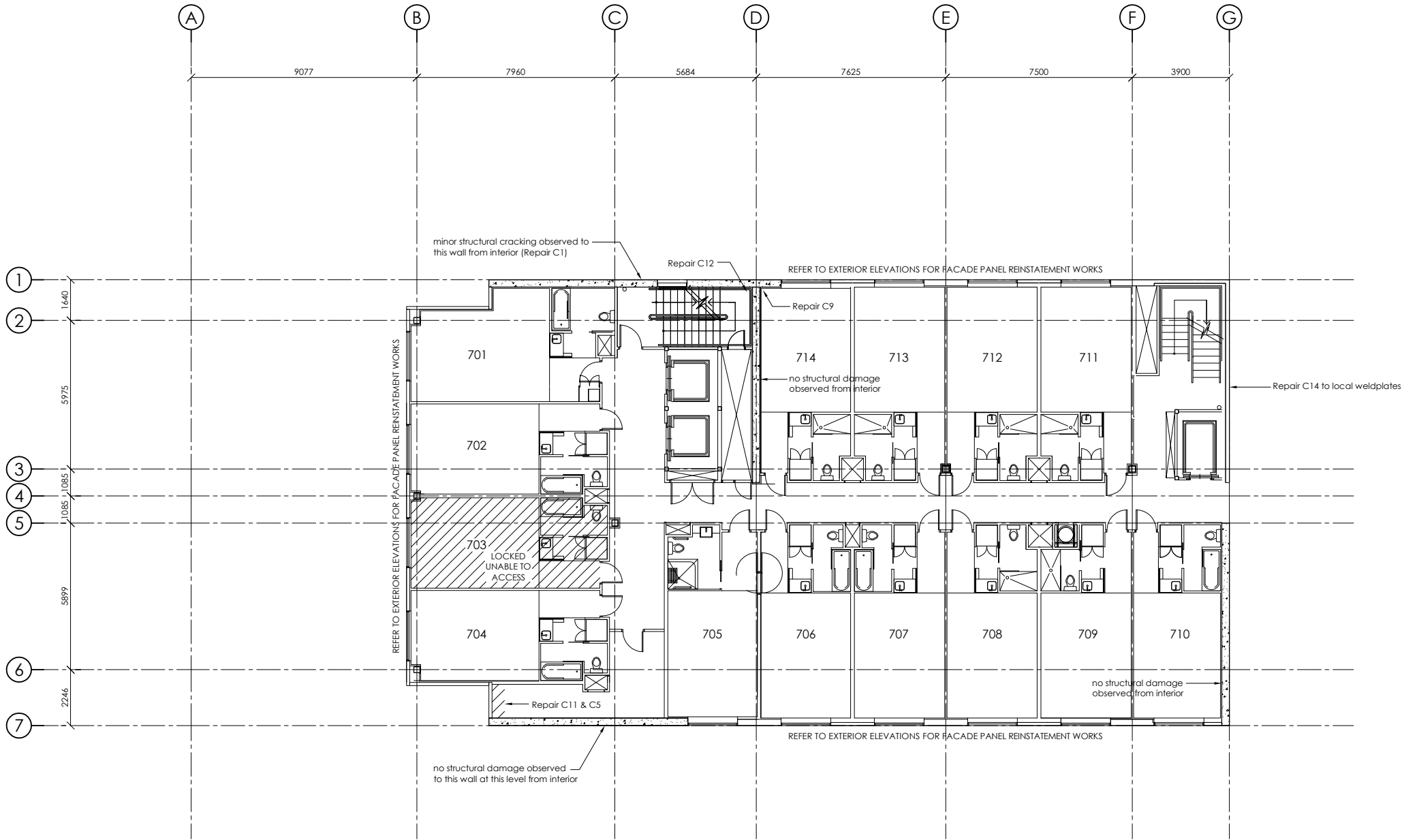
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LEVEL 7 FLOOR PLAN  
1:100

1	23/08/11	REPORT ISSUE	GPW
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ARCHITECT:



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CONSULTING ENGINEERS

PROJECT:

NOVOTEL  
CATHEDRAL SQUARE

DRAWING TITLE:

LEVEL 7 FLOOR PLAN

DRAWN: GPW	SCALE: 1:100 @ A1	
ENGINEER: AJW	1:200 @ A3	
CHECKED: CBL		
FILE: 110170	DRAWING NO. S9-1	REV. 1

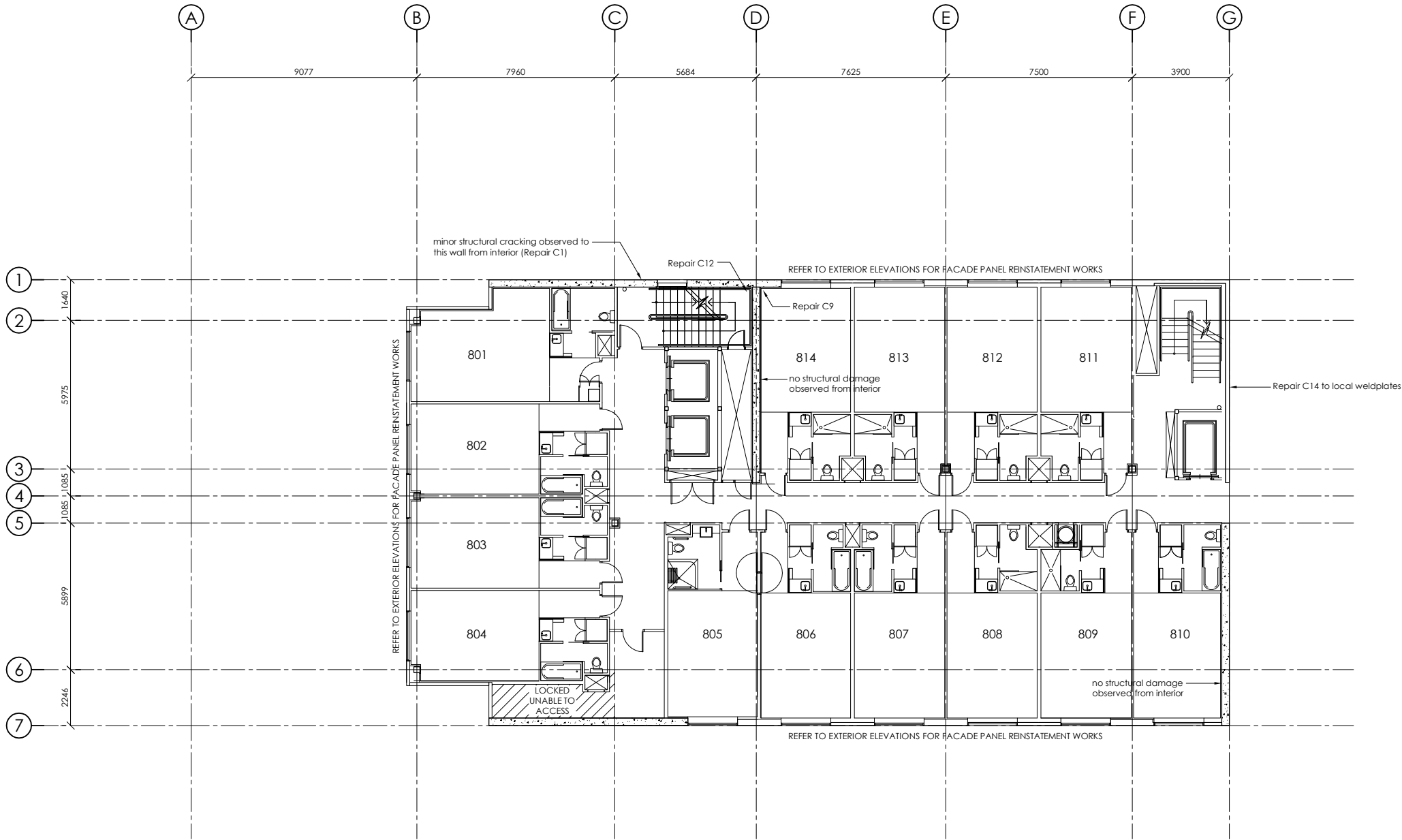
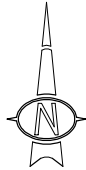
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LEVEL 8 FLOOR PLAN  
1:100

1	23/08/11	REPORT ISSUE	GPW
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CONSULTING ENGINEERS

PROJECT:

NOVOTEL  
CATHEDRAL SQUARE

DRAWING TITLE:

LEVEL 8 FLOOR PLAN

DRAWN: GPW	SCALE:	
ENGINEER: AJW	1:100 @ A1	
CHECKED: GPW	1:200 @ A3	
FILE: 110170	DRAWING NO. S10-1	REV. 1

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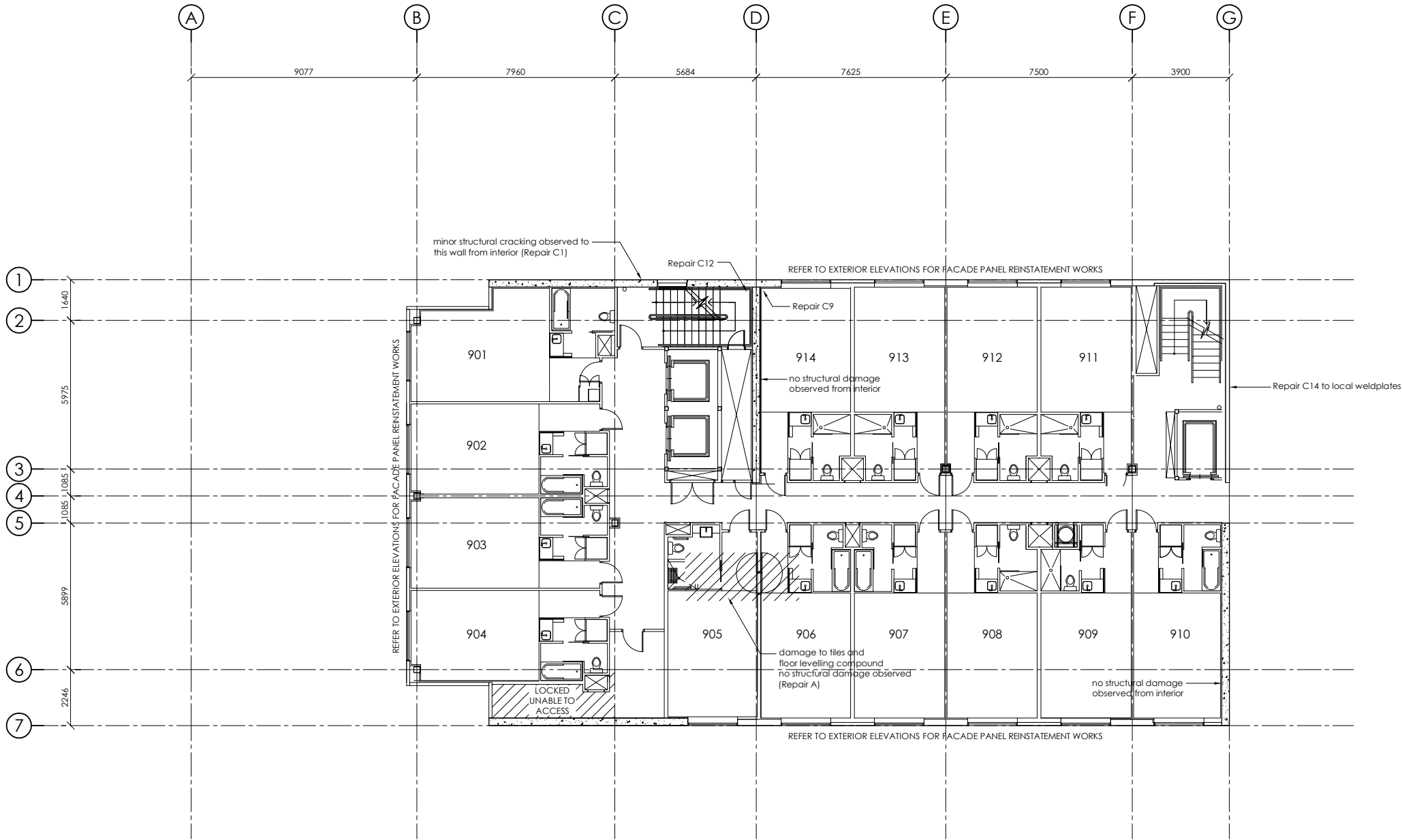
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LEVEL 9 FLOOR PLAN  
1:100

1	23/08/11	REPORT ISSUE	GPW
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PROJECT:

NOVOTEL  
CATHEDRAL SQUARE

DRAWING TITLE:

LEVEL 9 FLOOR PLAN

DRAWN: GPW	SCALE:	
ENGINEER: AJW	1:100 @ A1	
CHECKED: CBL	1:200 @ A3	
FILE: 110170	DRAWING NO. S11-1	REV. 1

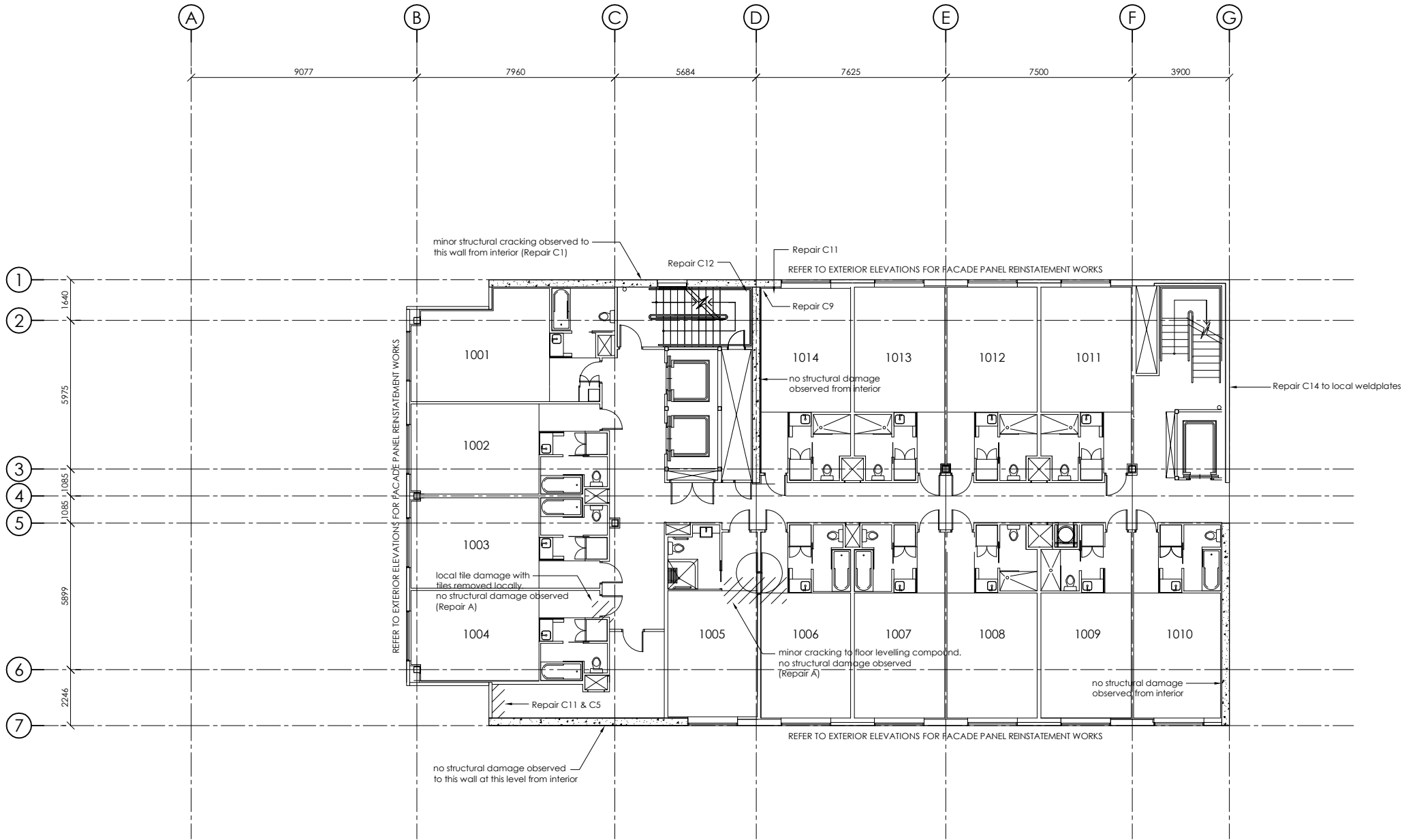
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LEVEL 10 FLOOR PLAN  
1:100

1	23/08/11	REPORT ISSUE	GPW
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PROJECT:

NOVOTEL  
CATHEDRAL SQUARE

DRAWING TITLE:

LEVEL 10 FLOOR PLAN

DRAWN: GPW	SCALE:	
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CHECKED: CBL	1:200 @ A3	
FILE: 110170	DRAWING NO. S12-1	REV. 1



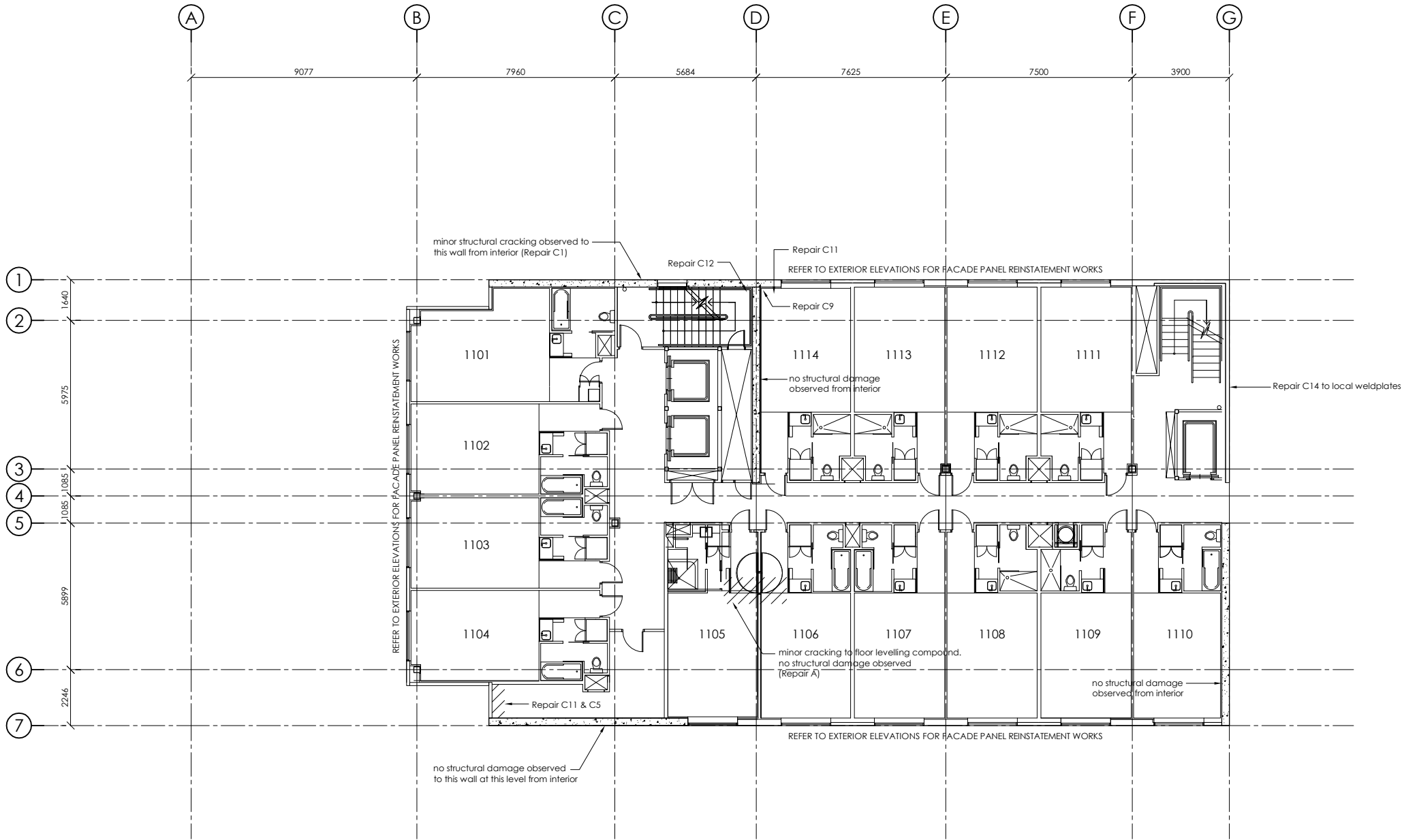
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LEVEL 11 FLOOR PLAN  
1:100

1	23/08/11	REPORT ISSUE	GPW
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PROJECT:

NOVOTEL  
CATHEDRAL SQUARE

DRAWING TITLE:

LEVEL 11 FLOOR PLAN

DRAWN: GPW	SCALE:	
ENGINEER: AJW	1:100 @ A1	
CHECKED: CBL	1:200 @ A3	
FILE: 110170	DRAWING NO. S13-1	REV. 1

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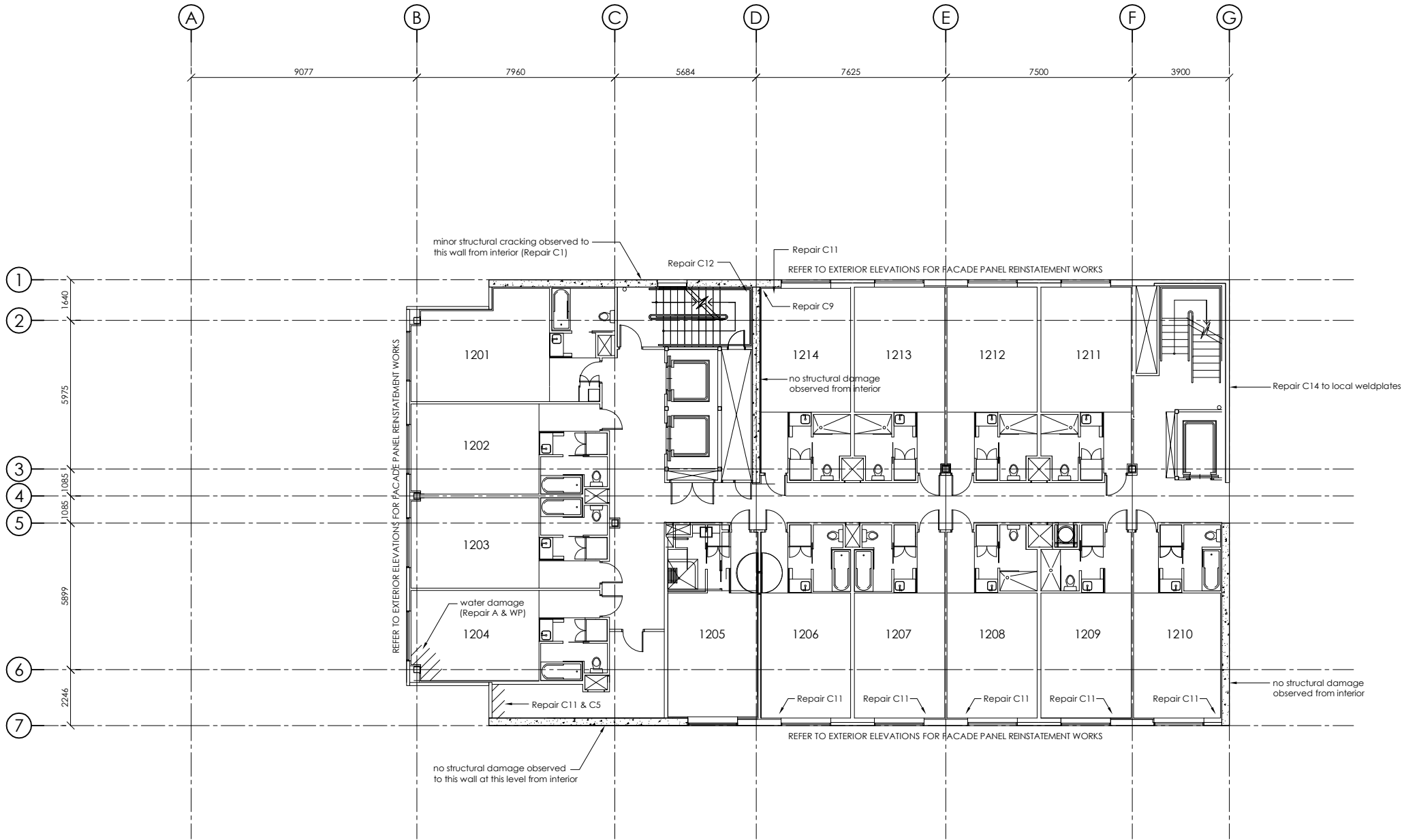
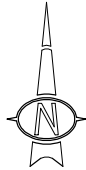
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LEVEL 12 FLOOR PLAN  
1:100

1	23/08/11	REPORT ISSUE	GPW
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ARCHITECT:



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PROJECT:

NOVOTEL  
CATHEDRAL SQUARE

DRAWING TITLE:

LEVEL 12 FLOOR PLAN

DRAWN: GPW	SCALE:	
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CHECKED: CBL	1:200 @ A3	
FILE: 110170	DRAWING NO. S14-1	REV. 1



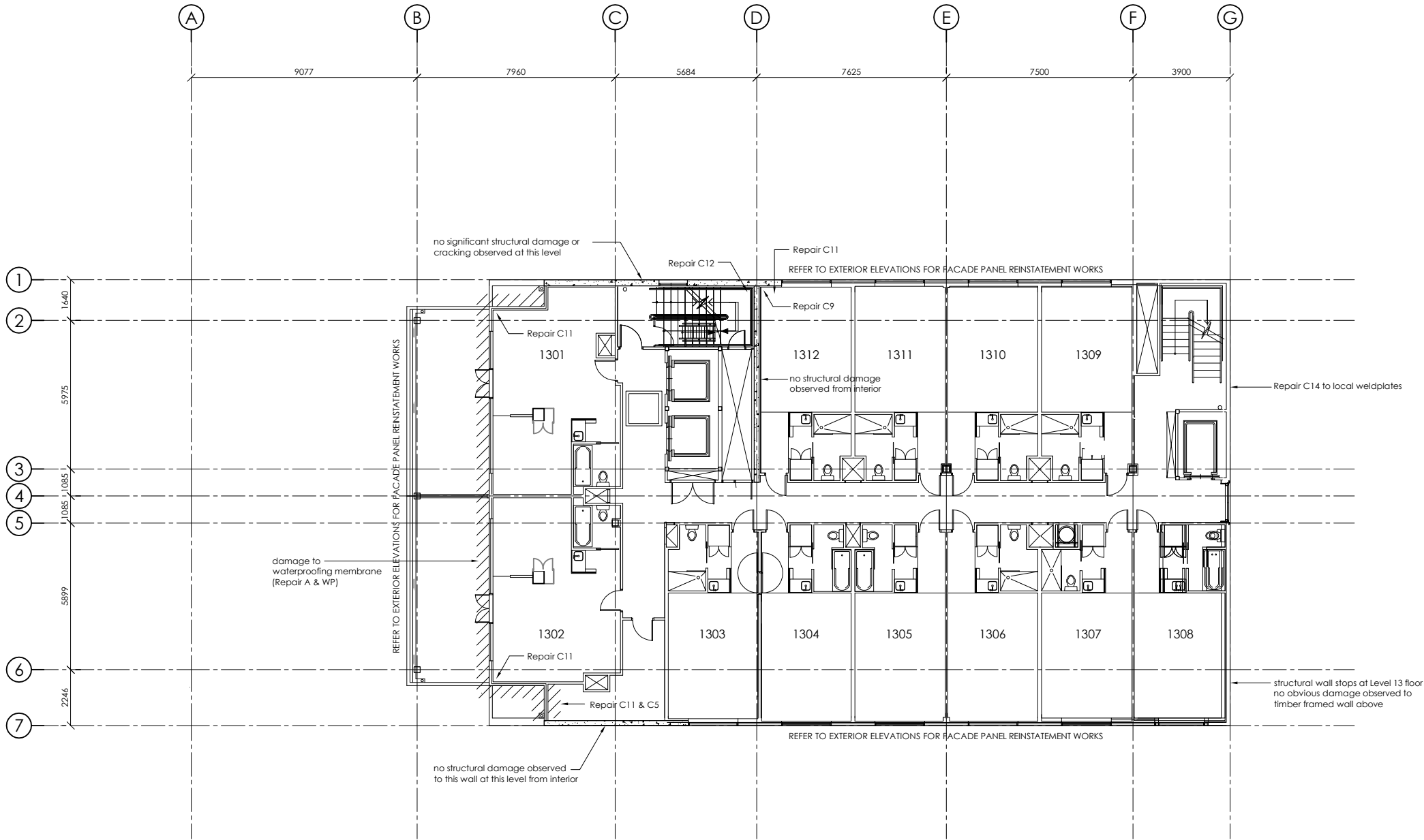
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LEVEL 13 FLOOR PLAN  
1:100

1	23/08/11	REPORT ISSUE	GPW
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PROJECT:

NOVOTEL  
CATHEDRAL SQUARE

DRAWING TITLE:

LEVEL 13 FLOOR PLAN

DRAWN: GPW	SCALE:	
ENGINEER: AJW	1:100 @ A1	
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FILE: 110170	DRAWING NO. S15-1	REV. 1

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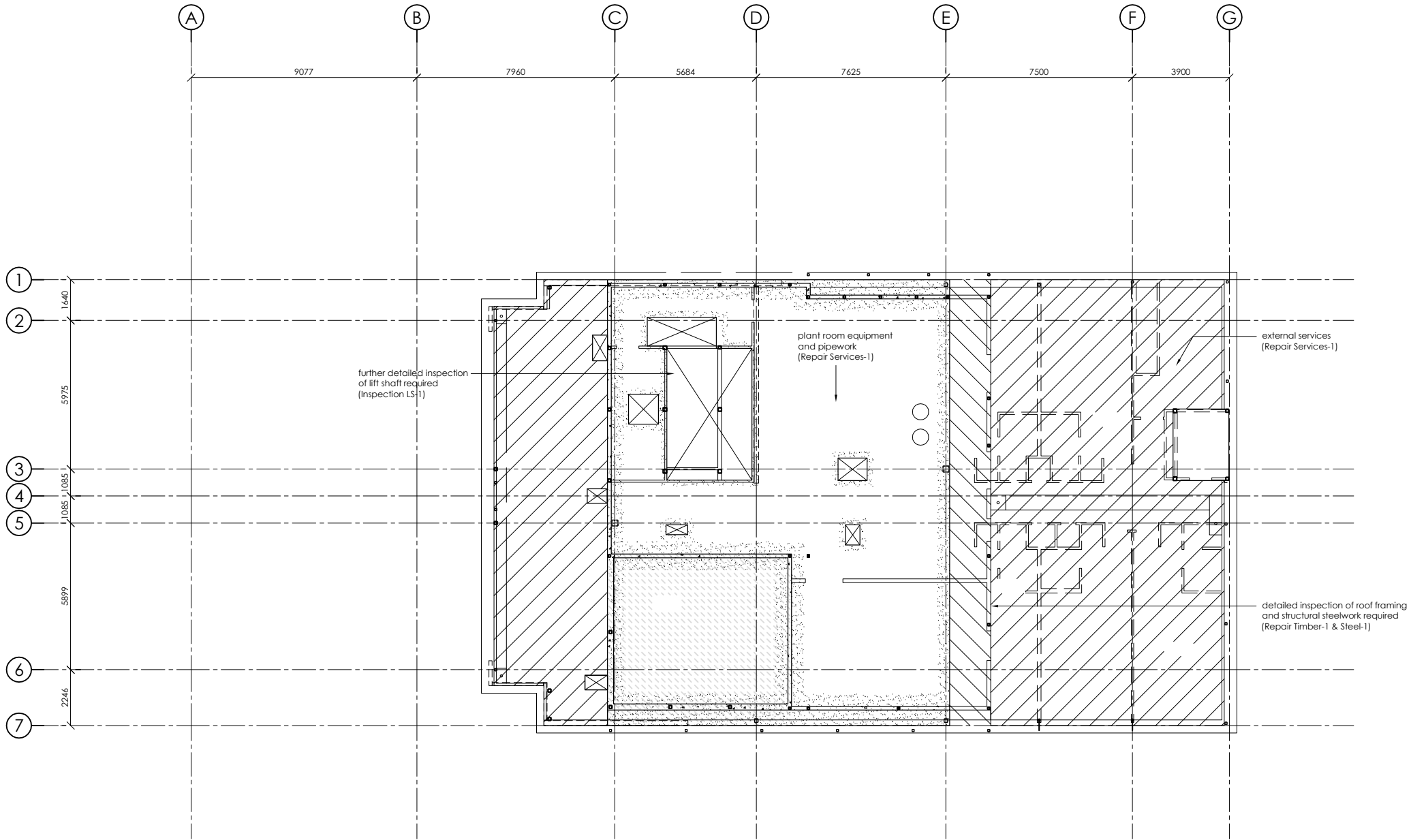
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PLANT ROOM FLOOR PLAN  
1:100

1	23/08/11	REPORT ISSUE	GPW
REV.	DATE	AMENDMENT	BY

ARCHITECT:



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PROJECT:

NOVOTEL  
CATHEDRAL SQUARE

DRAWING TITLE:

PLANT ROOM FLOOR PLAN

DRAWN: GPW	SCALE:	
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CHECKED:	1:200 @ A3	
FILE: 110170	DRAWING NO. S16-1	REV. 1



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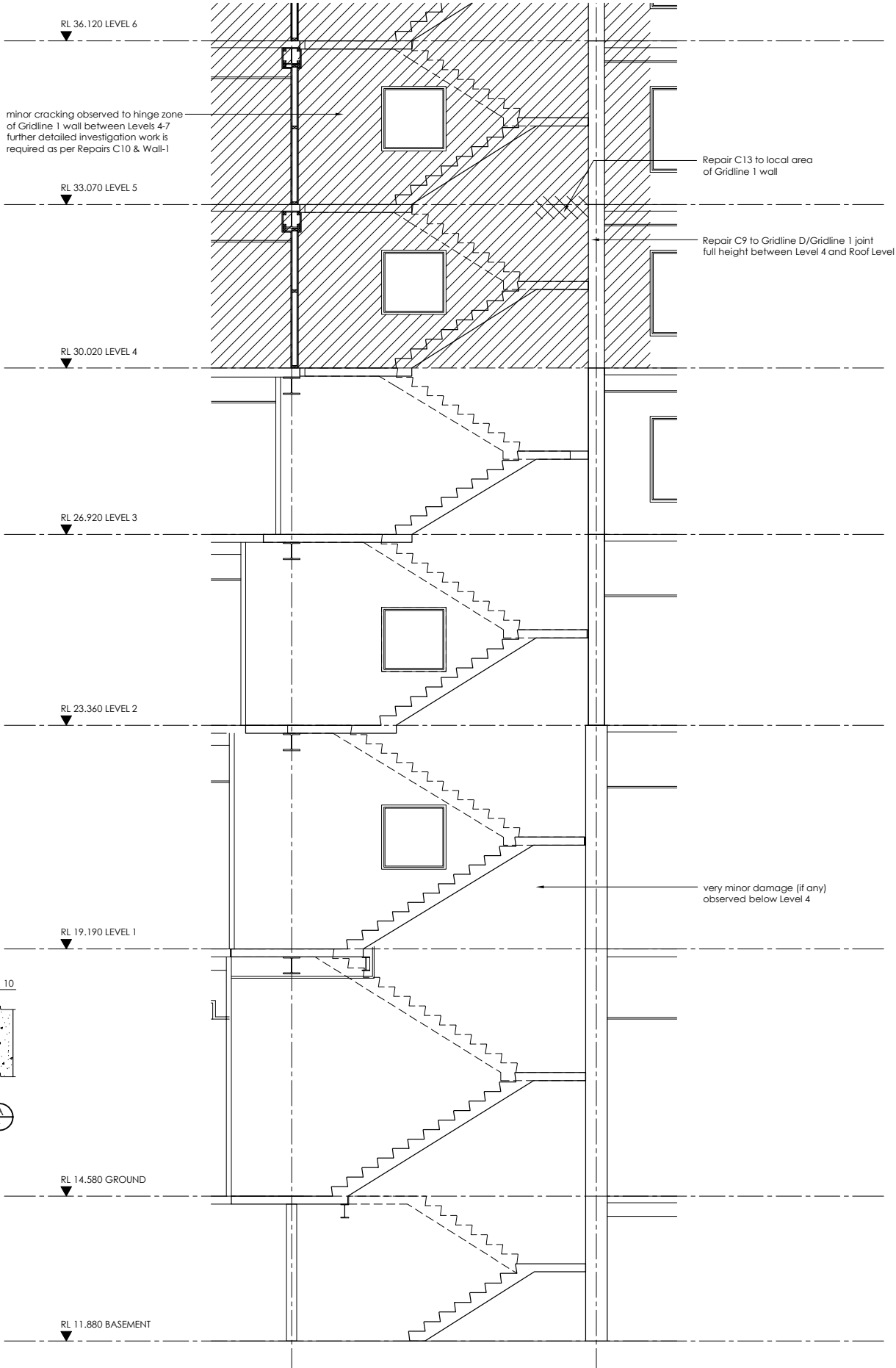
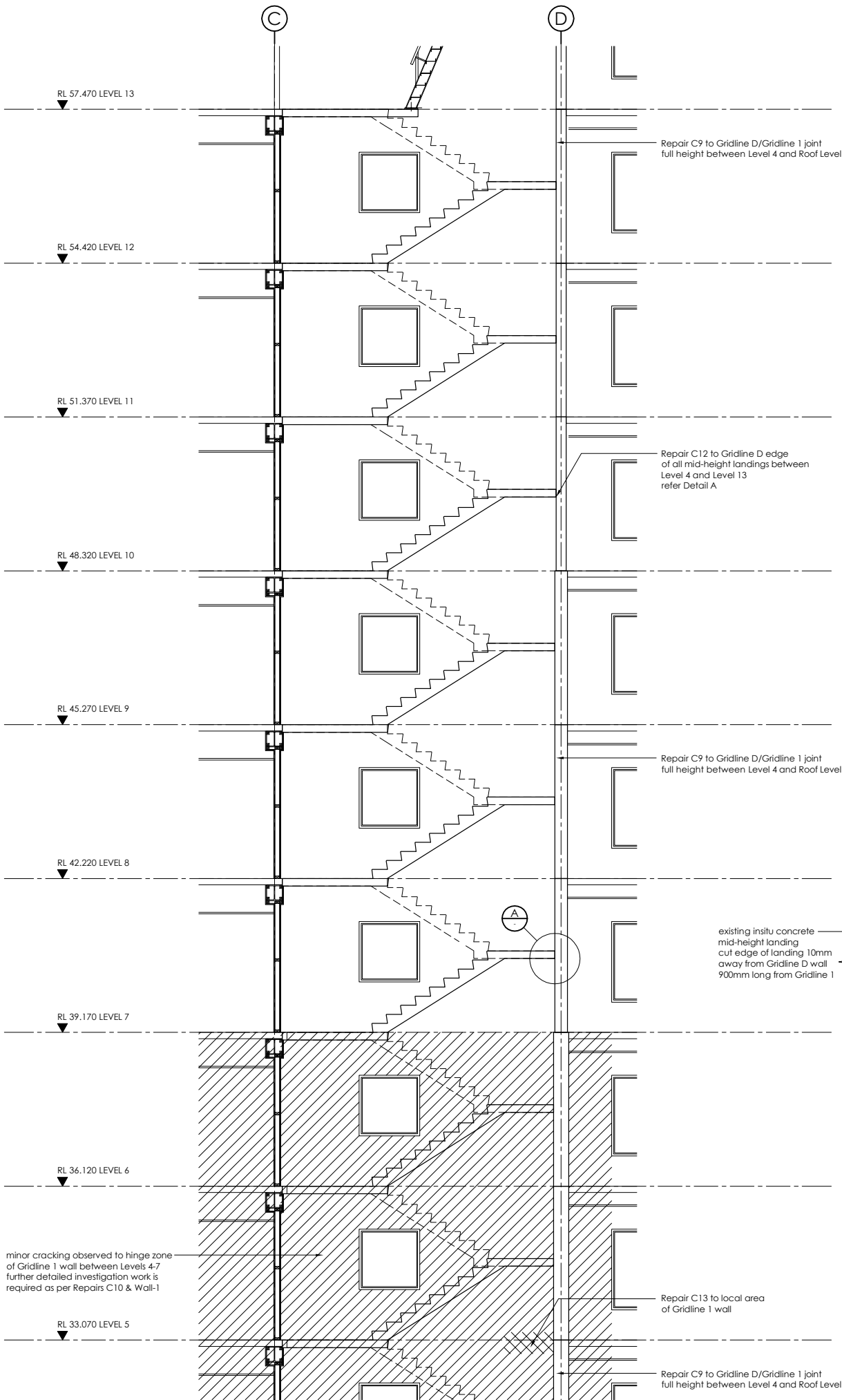
**NOVOTEL**  
**CATHEDRAL SQUARE**

DRAWING TITLE:

**STAIR 2 ELEVATION**

DRAWN: GPW	SCALE:	
ENGINEER: AJW	1:50 @ A1	
CHECKED:	1:100 @ A3	
FILE: 110170	DRAWING NO. S20-1	REV. 1

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1	23/08/11	REPORT ISSUE	GPW
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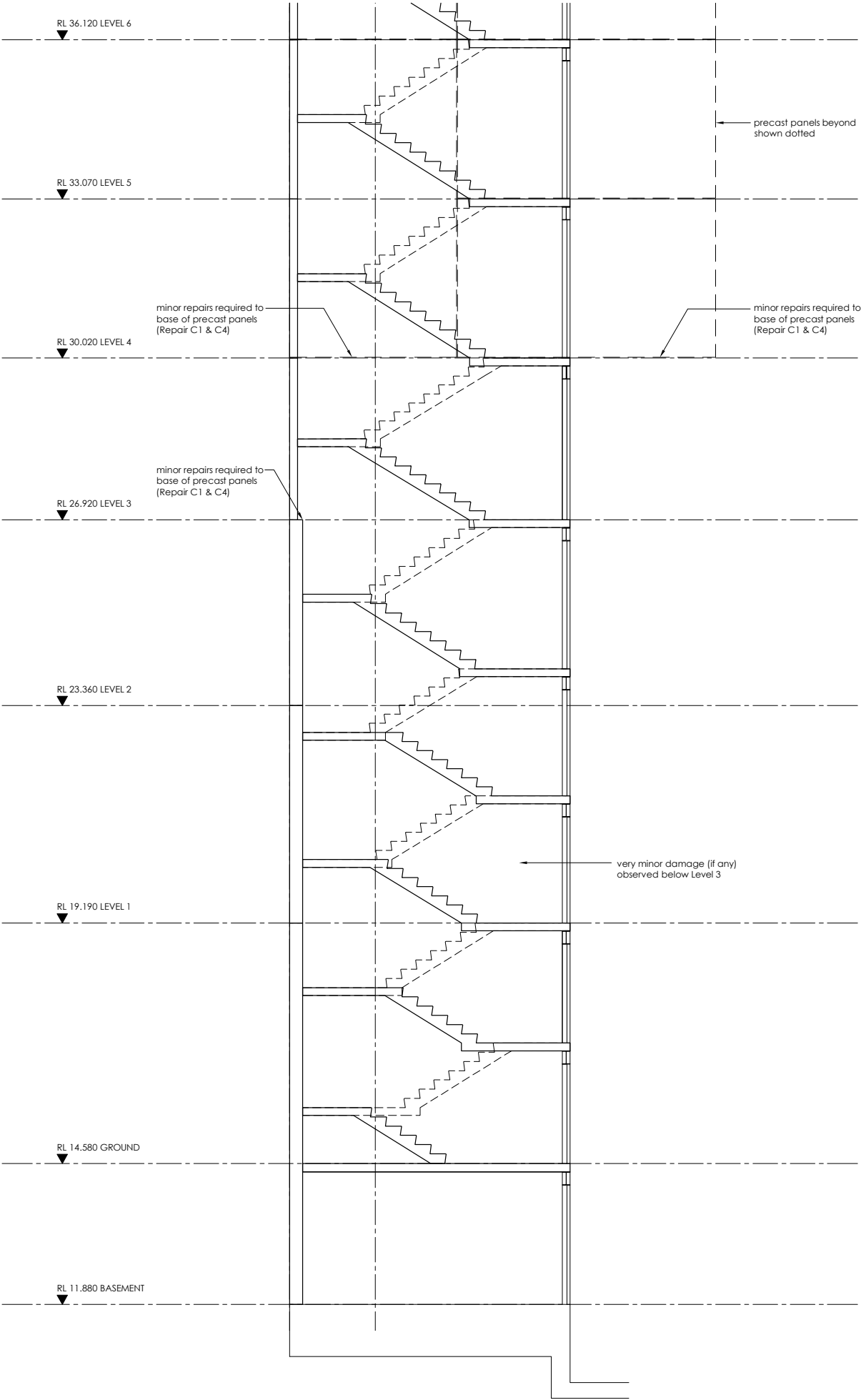
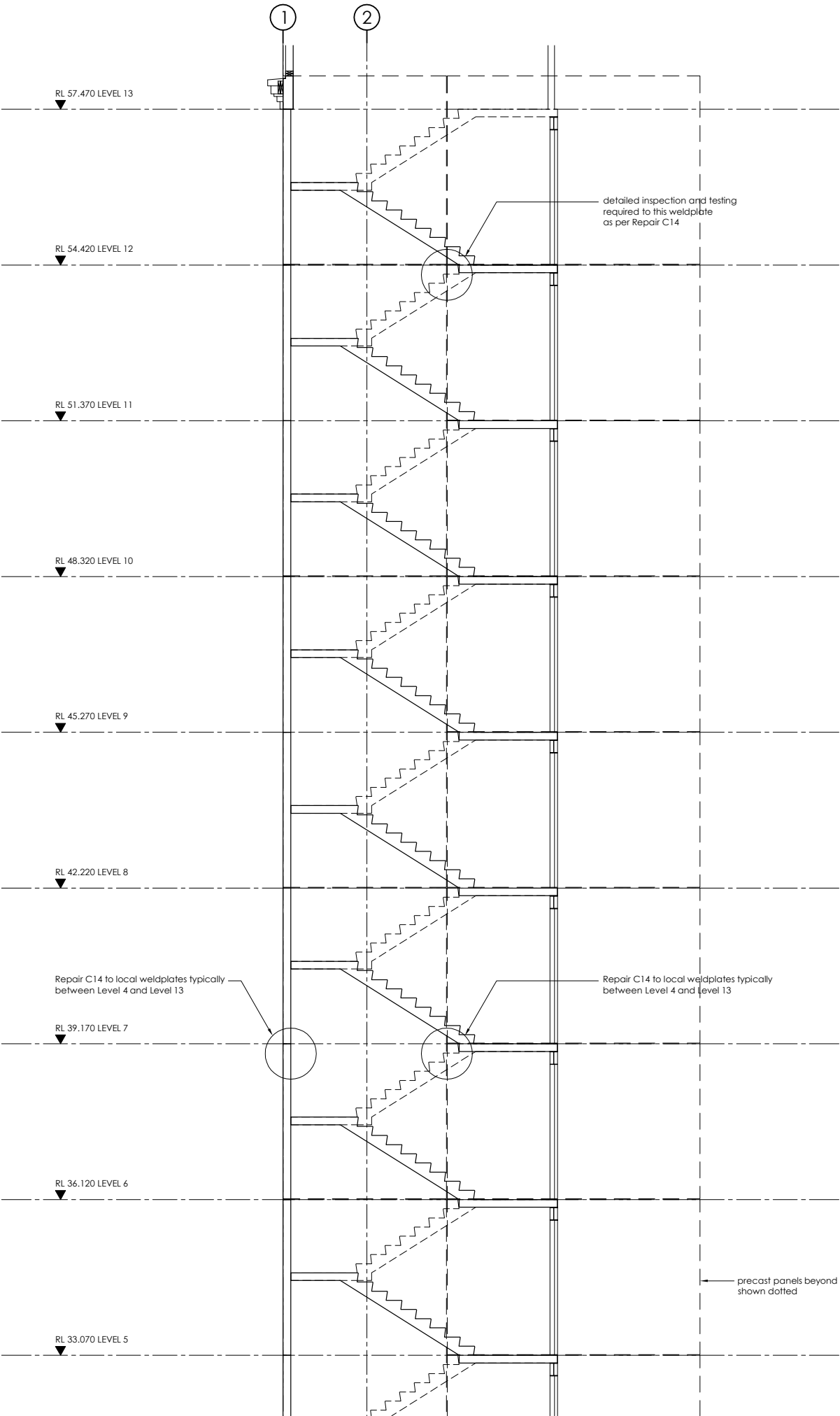
NOVOTEL  
CATHEDRAL SQUARE

DRAWING TITLE:

STAIR 3 ELEVATION

DRAWN:	GPW	SCALE:	1:50 @ A1
ENGINEER:	AJW		1:100 @ A3
CHECKED:			
FILE:	110170	DRAWING NO.	S20-2
		REV.	1

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REV.	DATE	AMENDMENT	BY

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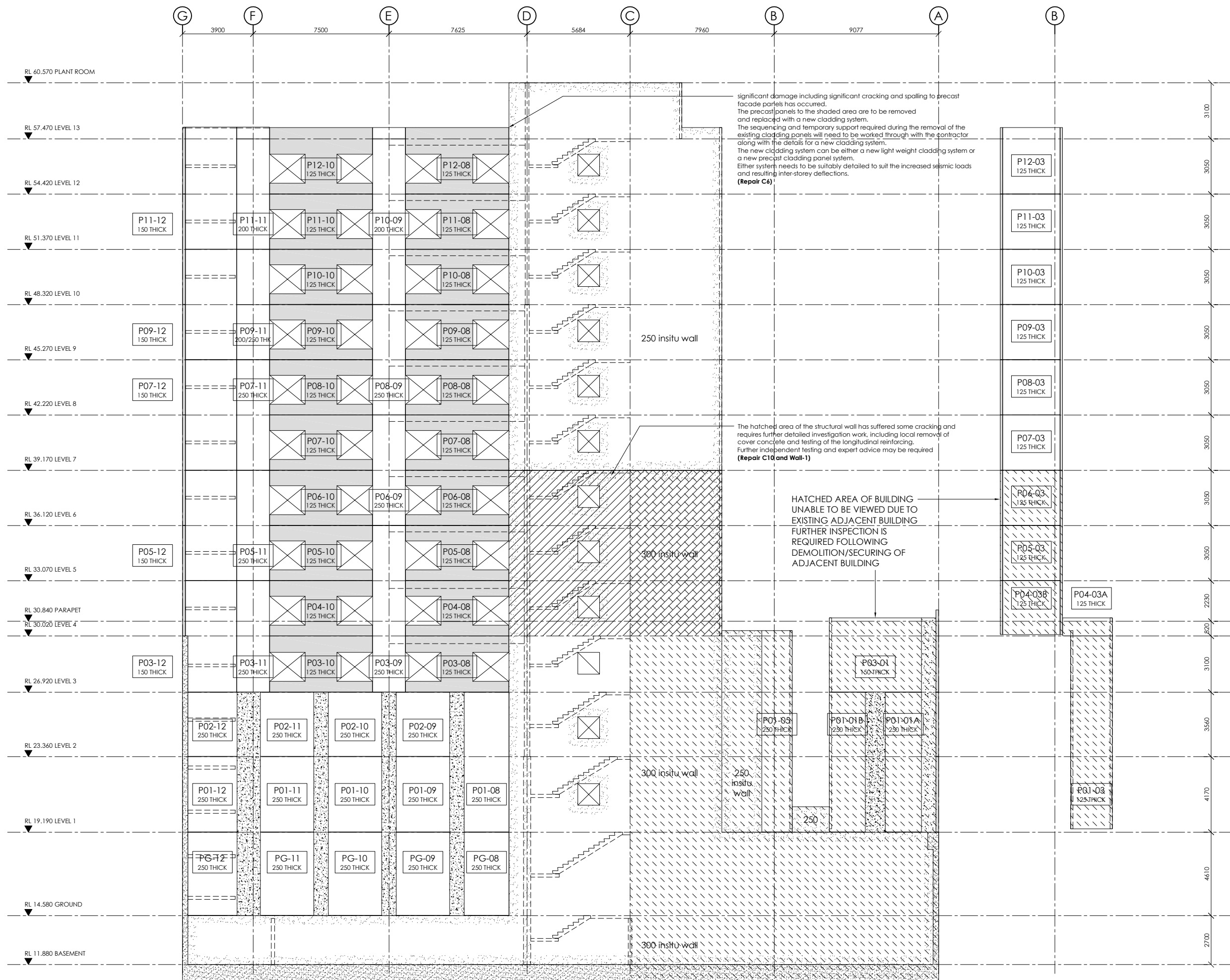
PROJECT:

NOVOTEL  
CATHEDRAL SQUARE

DRAWING TITLE:

NORTH ELEVATION

DRAWN: GPW		SCALE: 1:100 @ A1 1:200 @ A3	
ENGINEER: AJW			
CHECKED: CBL			
FILE: 110170	DRAWING NO. S30-1	REV. 1	



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lewis bradford  
CONSULTING ENGINEERS

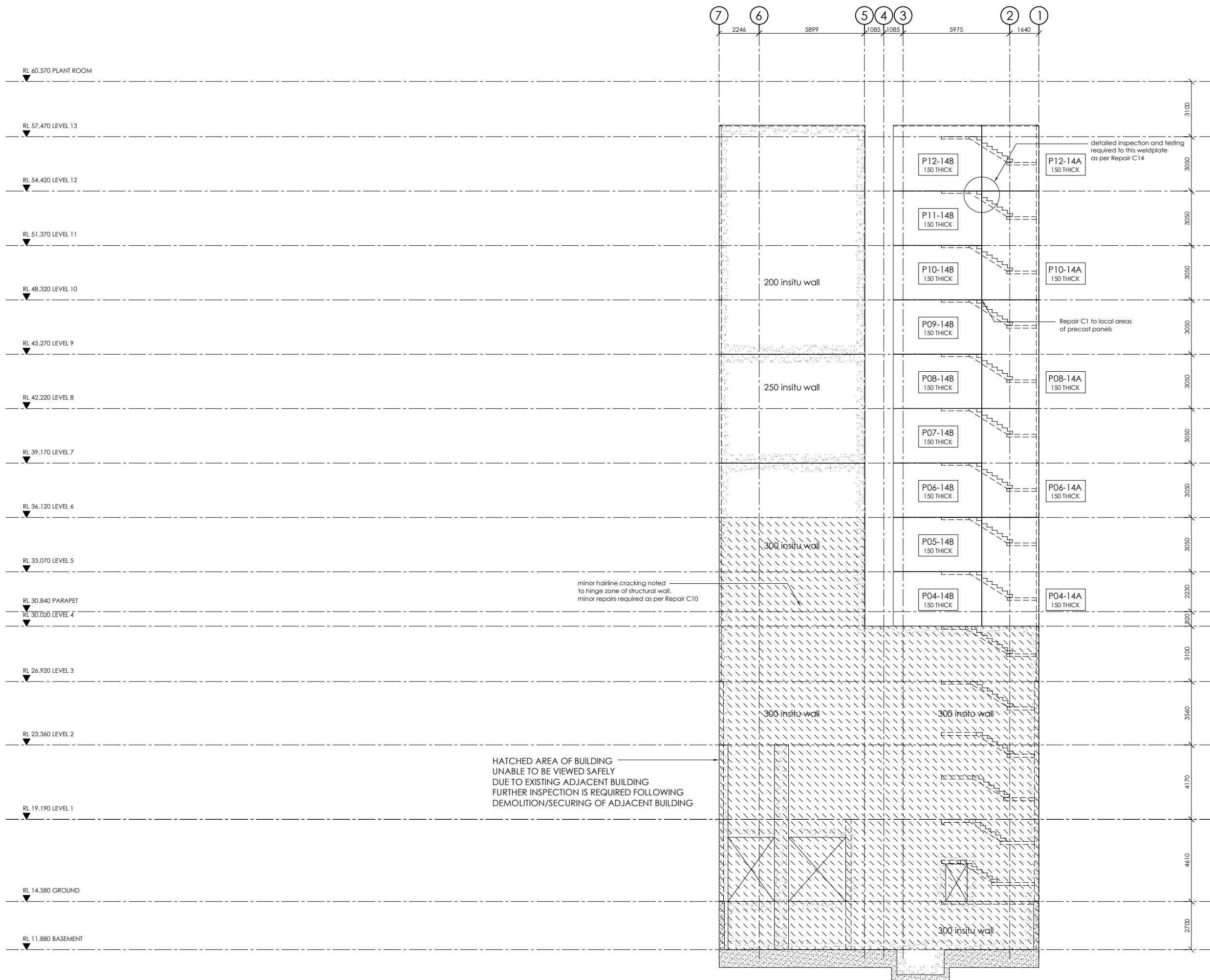
PROJECT:

NOVOTEL  
CATHEDRAL SQUARE

DRAWING TITLE:

EAST ELEVATION

DRAWN: GPW	SCALE:  1:100 @ A1  1:200 @ A3	
ENGINEER: AJW		
CHECKED: CBL		
FILE: 110170	DRAWING NO. S30-2	REV. 1





NOTES :

These drawings detail only the major areas of repair work required to the structure following the 22nd February 2011 earthquake and subsequent aftershocks up to the date of inspections in July 2011.

These drawings must be read in conjunction with the remainder of the report.

Areas of repair work to floor areas are shown indicative only and the extent shall be confirmed on site following removal of wall linings/floor coverings etc.

Any discrepancies shall be referred to Lewis Bradford Consulting Engineers for resolution before proceeding with work.

1	23/08/11	REPORT ISSUE	GPW
REV.	DATE	AMENDMENT	BY

ARCHITECT:



lewis bradford  
CONSULTING ENGINEERS

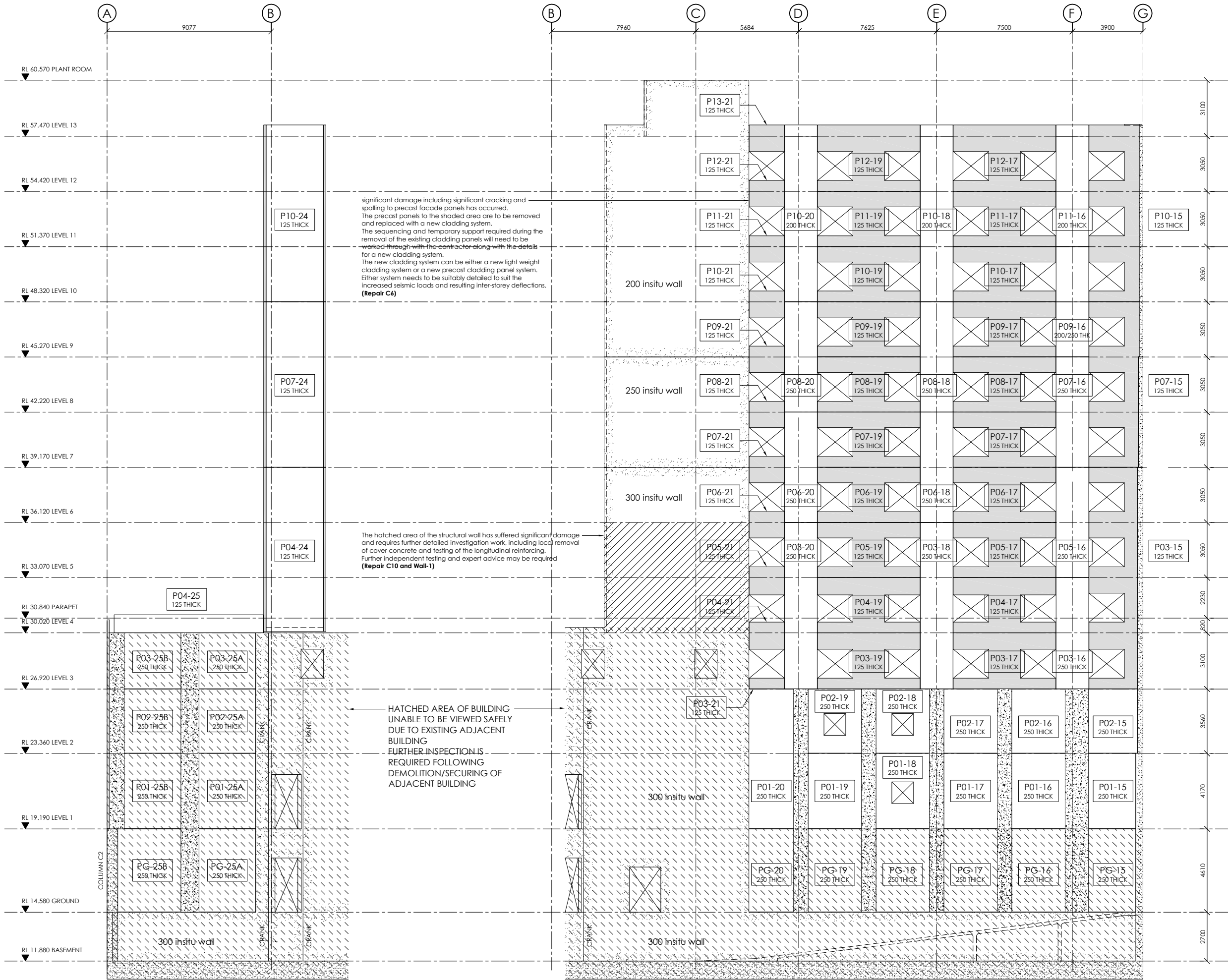
PROJECT:

NOVOTEL  
CATHEDRAL SQUARE

DRAWING TITLE:

SOUTH ELEVATION

DRAWN: GPW	SCALE:	
ENGINEER: AJW	1:100 @ A1	
CHECKED: CBL	1:200 @ A3	
FILE: 110170	DRAWING NO. S30-3	REV. 1



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CONTRACTOR TO VERIFY ALL DIMENSIONS ON SITE  
REFER TO ARCHITECT'S DRAWING FOR ALL SETOUTS

NOTES :

These drawings detail only the major areas of repair work required to the structure following the 22nd February 2011 earthquake and subsequent aftershocks up to the date of inspections in July 2011.

These drawings must be read in conjunction with the remainder of the report.

Areas of repair work to floor areas are shown indicative only and the extent shall be confirmed on site following removal of wall linings/floor coverings etc.

Any discrepancies shall be referred to Lewis Bradford Consulting Engineers for resolution before proceeding with work.

1	23/08/11	REPORT ISSUE	GPW
REV.	DATE	AMENDMENT	BY

ARCHITECT:



lewis bradford  
CONSULTING ENGINEERS

PROJECT:

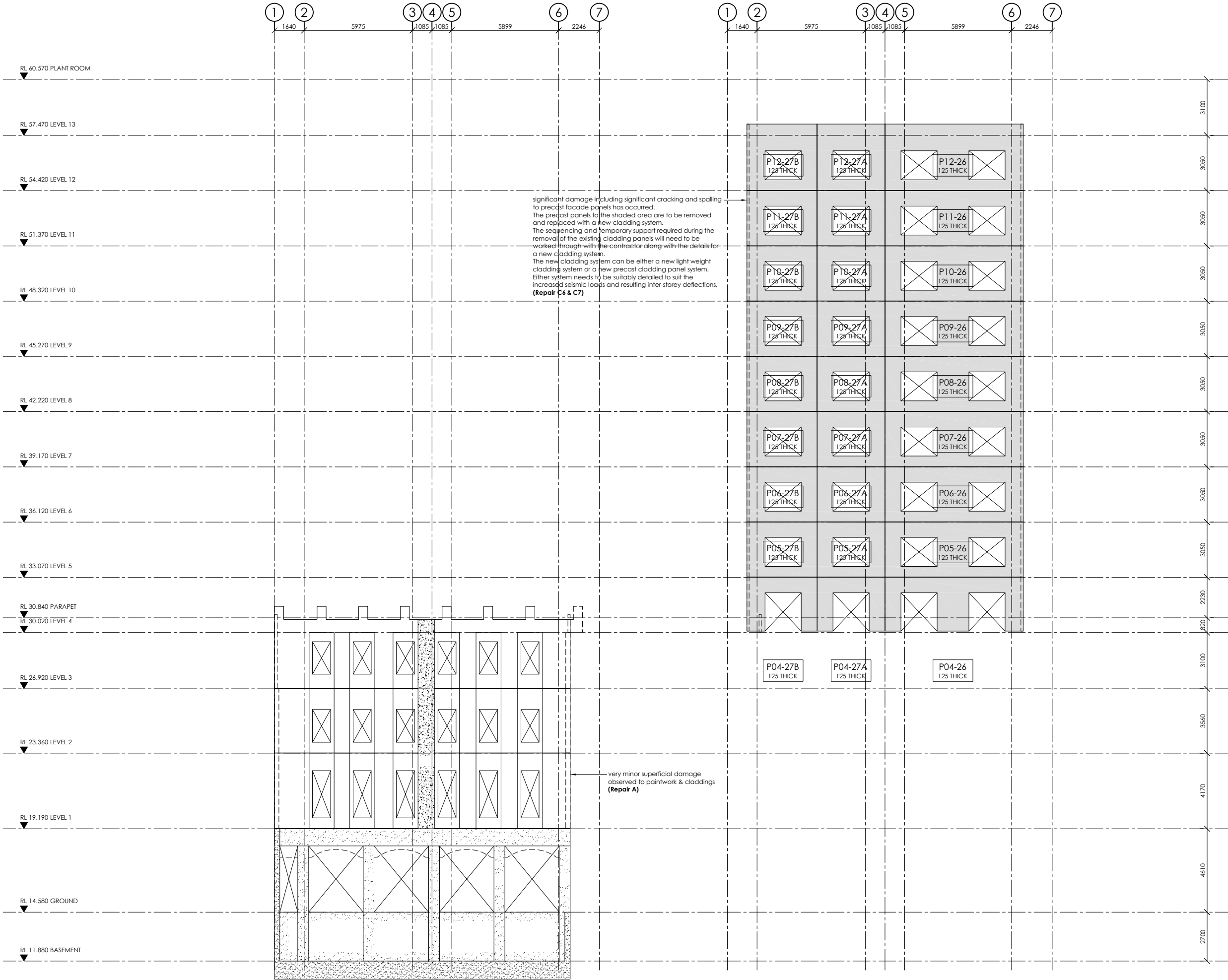
NOVOTEL  
CATHEDRAL SQUARE

DRAWING TITLE:

WEST ELEVATION

DRAWN: GPW	SCALE:	
ENGINEER: AJW	1:100 @ A1	
CHECKED: CBL	1:200 @ A3	
FILE: 110170	DRAWING NO. S30-4	REV. 1

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# APPENDIX F

## Previous Reports



FILE COPY



**lewis bradford**  
CONSULTING ENGINEERS

19 January 2011

Novotel Hotels  
PO Box 2561  
CHRISTCHURCH 8140

Attention: Richard Houghton

Dear Richard,

**STRUCTURAL EVALUATION OF NOVOTEL WARNERS HOTEL  
FOLLOWING DECEMBER 26<sup>TH</sup> 2010 EARTHQUAKE AFTERSHOCKS**

We write to confirm our discussions on site yesterday following my site walkover with yourself.

You have asked for a reinspection following the Boxing Day aftershocks in particular.

**Introduction**

This report should be read in conjunction with our previous report dated 17 September 2010 following the main September 4<sup>th</sup> earthquake.

There have been numerous aftershocks since September 4<sup>th</sup>, with the total number approaching 4,000. Included in this are fourteen aftershocks of magnitude 5.0 or greater with the last of these occurring on October 19<sup>th</sup>.

In addition a large aftershock (M4.9) struck close to the city on Boxing Day, December 26<sup>th</sup>, orientated largely west/east which caused significant further damage to vulnerable central city buildings.

Our inspections and this evaluation report, relate solely to the new multi-storey hotel, and do not include any aspects of the historic Warners Hotel, seismically separated from the new building, and subject to separate reporting by another structural firm.

**Recent Site Inspection and Observations**

The following observations were made on our brief visual inspection yesterday.

**a) Gib Cracking in Room 1306**

Minor gib cracking down southwest corner of room against southern wall where walls meet.

Superficial only and typical of several rooms especially against the south wall.

Superficial only due to interstorey movement between floors.

**b) Gib Cracking in Room 901**

Minor gib cracking in south wall of this room, on gib board sheet joins.



Again superficial only and due to interstorey movement between floors. Some other rooms similar.

Some of this probably also due to natural shrinkage of linings given the length of wall and heat buildup in a west facing room.

Both a) and b) can be repaired by competent tradesmen.

**c) Shrinkage to Corridor Linings**

Minor shrinkage cracking to the main west/east corridor linings especially at upper levels.

This is noticeably off the top and bottom corners of the corridor services door, visible as straight vertical cracks between the lining paper joins and gib sheet joins. (Note that both gib board and lining paper joints appear to line with the side jambs of these access doors).

We understand that these corridors get quite hot due to morning sun coming through the east wall windows.

We believe most of this is shrinkage related, but potentially exasperated by the earthquake shaking, especially the more pronounced west/east Boxing Day shaking. Can be repaired by competent tradesmen.

**d) Shrinkage Cracking off North Wall Windows**

Minor shrinkage cracking is evident off the corners of most north wall windows in the stairwell.

This is not surprising given the length of these insitu walls, the obvious concentration of shrinkage up the perforated vertical line of the windows; and the heat effects on drying shrinkage on a darkish painted north facing wall. (Especially given the reasonably hot dry summer being experienced).

These cracks are acceptably fine, and the vast majority of the drying shrinkage will have now occurred.

Whereas we believe the majority of the cracks are due to normal drying shrinkage, these may have been exasperated somewhat by the large number of aftershocks.

A high quality paint system applied by competent tradesmen will cover these cracks.

**e) Exterior of Western Elevation Above Level Four**

Several minor cracks were observed to this exterior elevation up the height of the building.

These are a combination of existing flexural cracks (from when the panels were originally cast, transported and erected), normal drying shrinkage related cracks; and earthquake shaking exaggeration of the above two effects.

As noted above the natural drying shrinkage of these panels will have been accelerated by this elevation facing west, being quite darkly painted and given the relatively hot dry summer being experienced.

The shaking experienced by the numerous aftershocks, and the main September 4<sup>th</sup> earthquake, will have had the effect of opening up, albeit slightly, these very fine hairline cracks which would normally be covered by the paint system.

These cracks are sufficiently fine that bridging by a quality high build paint system applied by skilled tradesmen should ensure moisture ingress is not a long term issue.

Structurally we have no concerns with these superficial cracks.

**f) Internal Plaster Cracking at Ground Level in Northwest Fire Egress Corridor**

A section of the inside face of the north wall of the north-western fire egress route has been plastered at ground floor level. This has cracked horizontally over a section approximately two metres above floor level. In addition some of the plaster is drummy in this area.

During construction of this section of wall, an area needed to be recast given unacceptable honeycombing of the original pour.

We believe the cracking is shrinkage related across the construction joint of this section that was recast, and not of structural concern. Flexing of this wall under earthquake shaking may have contributed also.

We recommend stripping off the existing plaster to this affected area, replastering and repainting by competent tradesmen.

**Conclusion**

Further to the conclusions of our original review and report dated 17 September 2010, we confirm that we believe the building has performed very well in the subsequent aftershocks and as expected.

We have no structural concerns with the building.

Further areas of damage as noted above are minor, of a superficial cosmetic nature, and can be repaired by competent tradesmen.

Please contact the undersigned if you require any further assistance.

Yours faithfully,



Craig B Lewis  
DIRECTOR  
110170 Le110119 Novotel Earthquake Evaluation



emailed also.

FILE COPY



lewis bradford  
CONSULTING ENGINEERS

17 September 2010

Novotel Hotels  
PO Box 2561  
CHRISTCHURCH 8140

Attention: Richard Houghton

Dear Richard,

**STRUCTURAL EVALUATION OF NOVOTEL WARNERS HOTEL  
FOLLOWING SEPTEMBER 4<sup>TH</sup> 2010 EARTHQUAKE**

We write to confirm our previous discussions and advice following the above earthquake and subsequent aftershocks.

**Introduction**

Our inspections and this evaluation report, relate solely to the new multi-storey hotel, and do not include any aspects of the historic Warners Hotel, seismically separated from the new building, and subject to separate reporting by another structural firm.

The new hotel was designed by Lewis Bradford Consulting Engineers, and constructed by Fletcher Construction – finishing in late 2009.

**Site Inspections**

A brief inspection of the hotel was carried out by the writer, Ashley Wilson (original design engineer for Lewis Bradford) and yourself at about 9am on the 4<sup>th</sup> September 2010 immediately after the main earthquake.

Superficial cracking of plaster in the main stairwell was noted at this time which was not a structural concern.

The building was deemed fit to occupy following this visit.

A subsequent, and more thorough site walkover, was carried out on the morning of 13 September 2010 between the writer and yourself.

This reviewed areas of damage which had been picked up by you and other hotel staff following the main earthquake and subsequent aftershocks.

## **Damaged Areas**

The following damaged areas have been noted and should be fully assessed by your insurers.

These are all superficial only and do not pose any structural concerns for the structure.

### **a) Cracking to Main Stairwell**

Vertical cracking is evident in the stairwell against the junction between the north shearwall and the eastern shearwall of the stairs. (Most evident between Levels 6 and 7, and 8 and 9).

This cracking occurs over most upper levels and is confined to the plaster skim coat over the main concrete walls.

The reason for the cracking is that above level four the north wall and the eastern wall of the stairs are physically separated as part of the structural design details. Below level four they are rigidly connected, and there is no cracking evident here.

This construction joint at the upper levels between walls has moved, very marginally, and cracked the plaster applied over it.

To repair this damage we recommend removing all loose and drummy plaster and paint.

We suggest contacting Jeff Hawker at Sika New Zealand to identify a flexible repair mortar to repair this damage before repainting these areas.

Such a product will hopefully accommodate movement across this joint in the event of future earthquakes, without the major cracking we have seen in the brittle plaster.

As discussed, to carry out a failsafe repair would entail breakout work, sawcutting the construction joint, applying flexible sealants and then painting.

This would be noisy and messy work which would be quite disruptive to the hotel.

We believe a flexible repair mortar solution, whilst not guaranteeing against future cracks in events such as we have just sustained, offers a low disruption, quick repair.

### **b) Minor Cracking in Main Stair Gib Linings**

Minor cracks at different levels are visible where the western lightweight gib wall frames into the northern shearwall.

These can be treated with paint and/or a flexible sealant.

### **c) Soffit of Level 12 Stair Flight Main Stair**

A small piece of concrete has spalled from the soffit of the precast stair flight where it meets the Level 12 landing in the main stair. This may have been weakened during construction and is minor only.



To tidy up aesthetically, breakback to sound concrete and rebuild the profile with a high strength cementitious mortar.

**d) Gib Cracking in Room 1302**

A quite large, but non structural, crack is visible above the door in room 1302.

Given this room is at the top and front of the hotel where the greatest displacements would have occurred this is not unexpected.

This can be repaired by restopping and painting.

**e) Gib Cracking in Room 1205**

Cracks evident between gib board sheets in this room also.

Comments and repairs as above.

Given the amount of cracking in this room compared to the other rooms either side and above this one, it may pay to check the gib fixings in this room.

**f) Steel Angle at Top of Main Stair Supporting Traydec**

Whilst not caused by the earthquake, this angle has been noted as being unsightly given the presence of some corrosion along its length and with it being unpainted.

This angle should be thoroughly prepared, primed and painted as for all other interior visible steelwork in the building.

Contractor shall refer to the original specification for the preparation and painting requirements.

**g) Western Elevation Precast Panels above Level Four Balcony**

Several hairline cracks are visible where these vertical panels are supported on the more rigid Level Four podium.

Some of these may have been existing shrinkage cracks which have opened up a bit more.

We recommend panels with this minor cracking be repainted with a quality high build paint system to prevent long term moisture ingress into the panels.

**h) Cracks in Fibreglass Tanking at Level Four Balcony Junction with Precast Wall Panels**

Minor cracking in the fibreglass tanking where this dresses into the western elevation panels is evident.

This is minor and due to differential stiffnesses between the floor system and panels during the earthquake.

We recommend this be repaired with the same tanking products as originally used, in strict accordance with the manufacturer's recommendations.

**i) Movement to Vertical Panel Joints up Western Corners of Building**

There is minor cracking up the vertical sealant joints, above the Level Four podium, to both the northwest and southwest corners of the building. This is to the sealant joints between western face precast panels and the north and south elevation insitu shearwalls.

Some movement is to the sealant, and some to the paint/edge concrete which abuts the sealant.

Thoroughly clean off the affected areas, generally by wirebrushing and repaint and reseal as necessary.

**j) Basement**

There does not appear to have been any movement issues to the basement. Several pre-existing shrinkage cracks were noted, but these were very fine and not of concern.

**Conclusion**

The building, as expected, has performed very well in the main earthquake and subsequent aftershocks, and is fit for normal occupancy and useage.

The above areas of damage are minor, and of a superficial cosmetic nature.

As previously noted, these superficial cracks are expected given the size of the building, the earthquake shaking that has occurred and the flexibility of the building especially at the higher levels.

Please contact the undersigned if you require any further assistance.

Yours faithfully,



Craig B Lewis  
DIRECTOR  
110170 Le100917 Novotel Earthquake Evaluation



# APPENDIX G

## Geotechnical Report





T&T Ref: 52144  
29 July 2011

Accor Ltd  
c/- carl.braddock@accor.com

Attention: Carl Braddock

Dear Carl

## **Geotechnical review and assessment for Warners Novotel**

### **1 Introduction**

#### **1.1 General**

This report summarises the results of a geotechnical post-earthquake assessment and review of the Warners Novotel site that has been completed by Tonkin & Taylor Ltd (T&T) on behalf of Accor Ltd.

The work which is described in this document was commissioned by Carl Braddock of Accor Ltd and has been completed in accordance with the terms and conditions which are outlined in T&T's letter of engagement dated 9 June 2011 and variation order No. 1 dated 20 June 2011.

#### **1.2 Site description**

The site is located in Cathedral Square of Christchurch central. The Warners building is a four story reinforced concrete structure and the Novotel tower is a 14 story reinforced concrete building with a single basement level. The locations of the buildings are shown on the attached site plan (Figure A1, Appendix A).

#### **1.3 22 February 2011 earthquake**

A magnitude 6.3 earthquake occurred near Lyttelton, approximately 6km south-east of the Novotel Warners site on 22 February 2011. This seismic event caused widespread damage in Christchurch, and land damage due to liquefaction occurred near the Novotel Warners site. There was no surface expression of liquefaction (sand boils, hummocky ground) in the immediate vicinity of the site.

#### **1.4 Scope of work**

T&T has undertaken the following scope of work as part of the post- earthquake assessment and review of the Warners Novotel site:

- A site investigation comprising 1 machine drilled borehole;



- Review of the existing site investigation information;
- The preparation of a geotechnical model for the site, including identification of materials that are potentially liquefiable;
- Review and reassessment of the liquefaction analysis data and update it for the 22 February 2011 earthquake peak ground accelerations and the changes to the NZS1170 code subsequent to the earthquake;
- Update of geotechnical design parameters;
- Preparation of this report outlining the findings of the investigation and the results of our assessments.

## 2 Subsurface conditions

### 2.1 Geology

The Geology of the Christchurch Urban Area<sup>1</sup>, of which an extract from the published map is shown in Figure 1 below, shows that the Novotel Warners site is immediately underlain by alluvial sand and silt overbank deposits of the Springston Formation, Yaldhurst Member. The Springston Formation is made up of post-glacial fluvial channel and overbank sediments consisting of well sorted gravel, sand and silt.

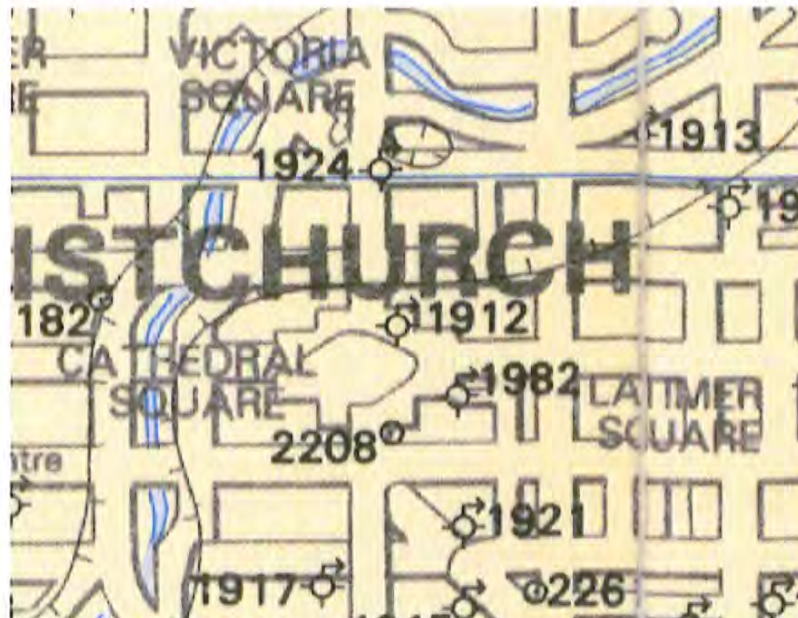


Figure 1 - Geological map of 50 Cathedral Square and surrounds (extract from Brown and Weeber, 1992)

### 2.2 Historical geotechnical information

#### 2.2.1 Environment Canterbury well borelogs

A number of Environment Canterbury well borelogs are available near the site. These logs provide a limited interpretation of the soil types encountered in the well bores for the area. The well logs indicate that the subsurface profile consists of approximately:

<sup>1</sup> Brown, L.J.; Weeber, J.H. 1992: Geology of the Christchurch Urban Area. Scale 1:25 000. Institute of Geological and Nuclear Sciences geological map 1.



- 1m of fill, overlying;
- 8m of gravel, overlying;
- 9m of sand, overlying;
- 6m of silt, overlying;
- Gravel from a depth of approximately 24m below the existing ground surface.

It should be noted that the wells were not drilled for geotechnical purposes and the soil interpretation may be unreliable.

## 2.3 T&T 2006 investigations

T&T undertook geotechnical investigations at the site during October and November 2006 comprising:

- Two machine drilled boreholes;
- Three Cone Penetration Tests (CPTs), and;
- Installation of a stand pipe piezometer.

Borehole logs are presented in Appendix B and CPT results are presented in Appendix C.

## 2.4 Current investigations

To augment the historical geotechnical information a site specific investigation was proposed, consisting of:

- 1 machine drilled borehole to a depth of 25m below the existing ground level;

The field exploration was performed between the period of 12 to 15 July 2011. The borehole is designated BH01. The borehole location is shown on Figure A1 (Appendix A). The borehole log is presented in Appendix B.

Two CPTs were proposed in addition to the borehole, but these were not carried out due to the strength of the materials encountered in the borehole, which indicated that the CPTs were unlikely to have progressed very far.

### 2.4.1 Borehole

One machine drilled borehole, BH01, was drilled to a depth of 26.45m below the existing ground level. The borehole was drilled using a rotary rig operated by Pro Drill Ltd of Auckland. During drilling, a geotechnical engineer logged the soil encountered and obtained samples for visual classification. The soil was logged in accordance with the New Zealand Geotechnical Society Guidelines<sup>2</sup>.

Standard Penetration Testing (SPT) was undertaken at 1.5m intervals, starting at a depth of 1.5m below the ground surface, within the machine drilled boreholes. The SPT sampler was driven using a 63.5 kg hammer falling 760mm. The rig was equipped with an automatic hammer.

Upon completion of the drilling, the borehole was backfilled in accordance with the rules set out in the Natural Resources Regional Plan (Environment Canterbury).

---

<sup>2</sup> FIELD DESCRIPTION OF SOIL AND ROCK, Guideline for the field classification and description of soil and rock for engineering purposes, NZ Geotechnical Society Inc, December 2005.

### 2.4.2 Cone Penetration Tests

Two Cone Penetration Tests (CPTs) were scheduled to be carried out at the Novotel Warners site. The CPTs were not performed at this time due to the presence of a shallow gravel layer and the strength of the underlying sand as indicated by the SPT results in the borehole. This layer is likely to have caused shallow refusal of the CPT probe and would not have provided any additional information.

## 2.5 Geotechnical model

Based on the existing information and borehole results the generalised subsurface profile is believed to be as per Table 1 below.

**Table 1 - Generalised subsurface profile**

Layer No.	Layer description	Layer thickness	Depth below ground level of base of layer
1	Loose GRAVEL (fill)	1 m	1 m
2	Medium dense to dense GRAVEL with some sand	8 m	9 m
3	Medium dense SAND	9.5 m	18.5 m
4	Very soft to soft SILT	2 to 2.5 m	20.5 to 21 m
5	Stiff to very stiff SILT	3 m	23.5 to 24 m
6	Dense to very dense GRAVEL	Unknown	Unknown

## 3 Seismic assessment

### 3.1 Earthquake scenarios

Two earthquake scenarios derived from “NZS1170 – Structural Design Actions” were considered assuming an Importance level 3 structure with a 50 year design working life, and allowing for recent changes to the Department of Building and Housing Compliance Document Clause B1 that were implemented on 19 May 2011 for Canterbury. In addition, an analysis was undertaken for the 22 February 2011 earthquake (based on ground motions recorded near the site). The soil was assumed to be Class D (deep or soft soils). Earthquake scenarios used are summarised in Table 2 below:

**Table 2- Earthquake scenarios used in the liquefaction assessment**

	Serviceability Limit State (SLS)	Ultimate Limit State (ULS)	22 February 2011 earthquake
Return period factor, R	0.33 <sup>(1)</sup>	1.3 <sup>(2)</sup>	-
Magnitude, M	7.5	7.5	6.3
Peak ground acceleration	0.11 g	0.44 g	0.73 g <sup>(3)</sup>

(1) This corresponds to a return period of approximately 45 years, increased from 25 years ( $R = 0.25$ ) in accordance with the changes to Clause B1 that took effect on 19 May 2011.

(2) This corresponds to a return period of 1000 years.

(3) Peak ground acceleration recorded by GNS REHS (Christchurch Resthaven) seismograph 0.86 km north of the site.

### 3.2 Liquefaction assessment

An assessment of the liquefaction risk at the 50 Cathedral Square site showed that during the design ULS earthquake, the site can be classified as Performance Level L1 – “Mild” in the NZGS Guidelines for Geotechnical Earthquake Engineering Practice in New Zealand<sup>3</sup>. This corresponds to Limited excess pore water pressures without complete liquefaction; relatively small deformation of the ground with relatively small settlements (few tens of millimetres).

The Performance Level consistent with observed damage following the 22 February 2011 earthquake is L1.

Liquefaction is a natural phenomenon where densification of loose sands beneath the water table occurs during earthquake shaking. This causes a build up of pressure in the water between the soil particles. This excess pore water pressure can increase to a point where it overcomes the effective stress of the soil so that the soil loses its strength and stiffness – effectively acting as a liquid.

Liquefaction analyses have been carried out on the borehole results using the method of Seed et al. (2003)<sup>4</sup> to determine if the founding soils are likely to be susceptible to liquefaction during future seismic events.

The liquefaction assessment results are summarised in Table 3 and Table 4. The assessment predicts that no significant soil layers liquefied in the 22 February 2011 earthquake. There is a very low risk of the medium dense sand layer liquefying in a future SLS earthquake and a low to moderate risk of this layer liquefying in a future ULS earthquake. Liquefaction induced *total* settlements were predicted to be minor for the 22 February earthquake.

**Table 3 - Preliminary liquefaction assessment results: Risk**

Layer No.	Soil Layer	Risk of liquefaction		
		SLS (M=7.5, PGA=0.11g)	ULS (M=7.5, PGA=0.34g)	22 Feb 2011 (M=6.3, PGA=0.63g)
1	Loose GRAVEL (fill)	Very low	Very low	Very low
2	Medium dense to dense GRAVEL with some sand	Very low	Low	Low
3	Medium dense SAND	Very low	Low to moderate	Low to moderate
4	Very soft to soft SILT	Very low	Very low	Very low
5	Stiff to very stiff SILT	Very low	Very low	Very low
6	Dense to very dense GRAVEL	Very low	Very low	Very low

<sup>3</sup> New Zealand Geotechnical Society (2010) Geotechnical Earthquake Engineering Practice – Module 1 – Guideline for the identification, assessment and mitigation of liquefaction hazards, Rev 0, July 2010.

<sup>4</sup> Seed et al. (2003), Recent advances in soil liquefaction engineering: a unified and consistent framework 26th Annual ASCE Los Angeles Geotechnical Spring Seminar, Keynote Presentation, HMS Queen Mary, Long Beach, California



**Table 4 - Preliminary liquefaction assessment results: Effects**

	<b>SLS</b> (M=7.5, PGA=0.11g)	<b>ULS</b> (M=7.5, PGA=0.44g)	<b>22 Feb 2011</b> (M=6.3, PGA=0.73g)
Cumulative thickness of liquefied layers	Approximately 0.0 m thick	Approximately 0.1 m thick	Approximately 0.1 m thick
Estimated liquefaction induced <i>total</i> settlement	Approximately 0 mm	Approximately 0-10 mm	Approximately 0-10 mm

## 4 Geotechnical parameters

From interpretations of the site investigation undertaken at the site, the following soil parameters are considered appropriate for detailed design purposes.

**Table 5 - Soil parameters**

<b>Layer</b>	<b>Layer description</b>	<b>Density (kN/m<sup>3</sup>)</b>	<b>Young's Modulus, E (MPa)</b>	<b>Friction angle, <math>\phi'</math> (deg)</b>	<b>Drained cohesion, <math>c'</math> (kPa)</b>
1	Loose GRAVEL (fill)	19	19	30	0
2	Medium dense to dense GRAVEL with some sand	19	40	36	0
3	Medium dense SAND	19	25	34	0
4	Very soft to soft SILT	18	2	23	0
5	Stiff to very stiff SILT	18	6	30	5
6	Dense to very dense GRAVEL	19	65	40	0

## 5 Summary

The purpose of this report is to present the results of a post-earthquake geotechnical assessment and review for the Novotel Warners site. The assessment comprised:

- A site investigation comprising 1 machine drilled borehole;
- Review of the existing site investigation information;
- The preparation of a geotechnical model for the site, including identification of materials that are potentially liquefiable;
- Review and reassessment of the liquefaction analysis data and update it for the 22 February 2011 earthquake peak ground accelerations and the changes to the NZS1170 code subsequent to the earthquake;
- Update of geotechnical design parameters.

The main conclusions of the assessment include:

- The Novotel Warners site is underlain by sandy gravel, sand and silt to a depth of approximately 24 m below the existing ground surface, overlying, dense to very dense sandy gravels.
- There is a low to moderate risk of liquefaction in the soils underlying the Novotel Warners site in a future ULS event.

## 6 Applicability

This report has been prepared for the benefit of Accor Ltd with respect to the particular brief given to us and it may not be relied upon in other contexts or for any other purpose without our prior review and agreement.

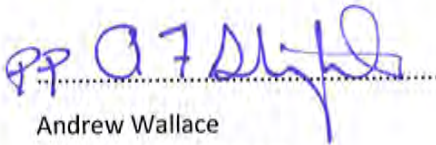
This opinion is not intended to be advice that is covered by the Financial Advisers Act 2010.

Tonkin & Taylor Ltd

Environmental and Engineering Consultants

Report prepared by:

Authorised for Tonkin & Taylor Ltd by:



Andrew Wallace

Geotechnical Engineer



Anthony Fairclough

South Island Geotechnical Co-ordinator

1-Aug-11  
document2

## **Appendix A:        Figures**



# Warners Novotel



Figure A1

△ CPT (2006)  
⊕ BHI (2006)  
⊕ BHI (2011)

## **Appendix B:        Borehole log**

- **BH01 (2011)**
- **BH1, BH2 (2006)**



# TONKIN & TAYLOR LTD

## BOREHOLE LOG

BOREHOLE No: BH01

Hole Location:

SHEET 1 OF 3

PROJECT: Novotel - Warners				LOCATION: 50 Cathedral Square				JOB No: 52144															
CO-ORDINATES				DRILL TYPE: Kubota tractor rig				HOLE STARTED: 11/7/11															
R.L. m				DRILL METHOD: Rotary				HOLE FINISHED: 15/7/11															
DATUM N/A				DRILL FLUID: Austdrill				LOGGED BY: ADW/STT CHECKED:															
GEOLOGICAL				ENGINEERING DESCRIPTION																			
GEOLOGICAL UNIT, GENERIC NAME, ORIGIN, MINERAL COMPOSITION,				FLUID LOSS	WATER	CORE RECOVERY (%)	METHOD	CASING	TESTS	SAMPLES	R.L. (m)	DEPTH (m)	GRAPHIC LOG	CLASSIFICATION SYMBOL	MOISTURE CONDITION	WEATHERING	STRENGTH/DENSITY CLASSIFICATION	SHEAR STRENGTH (kPa)	COMPRESSIVE STRENGTH (MPa)	DEFECT SPACING (mm)	SOIL DESCRIPTION Soil type, minor components, plasticity or particle size, colour.  ROCK DESCRIPTION Substance: Rock type, particle size, colour, minor components. Defects: Type, inclination, thickness, roughness, filling.		
No Recovery.						0						1									No Recovery. Sucker truck.		
Yaldhurst Member of the Springston formation.						33	SPT		12/2/3/3/7 N=16		2		GW	M	MD						Gravelly SAND, fine to coarse, brown. Moist, medium dense. Gravel is fine to medium.		
						16				3												GRAVEL with some sand and rare cobbles, medium to coarse, grey mottled with white and pragne. Wet, medium dense. Gravel is sub rounded to sub angular. Sand is coarse.	
						27	SPT		3/12/12/7/6/5 N=30		4												
						43				5													- becoming dense.
						100	SPT		11/12/10/9/11/8 N=38		6												
Christchurch formation.						86					7												
						44	SPT		6/6/8/8/9/8 N=33		8												
						71					9												
						56	SPT		13/4/5/3/4/4 N=16		10												
						0																	
		62	SPT		5/4/8/8/8/5 N=29																		

T+T DATATEMPLATE.GDT adw





## TONKIN &amp; TAYLOR LTD

## BOREHOLE LOG

BOREHOLE No: BH01

Hole Location:

SHEET 2 OF 3

PROJECT: Novotel - Warners		LOCATION: 50 Cathedral Square		JOB No: 52144															
CO-ORDINATES		DRILL TYPE: Kubota tractor rig		HOLE STARTED: 11/7/11															
R.L. m		DRILL METHOD: Rotary		HOLE FINISHED: 15/7/11															
DATUM N/A		DRILL FLUID: Austdrill		DRILLED BY: ProDrill															
				LOGGED BY: ADW/STT CHECKED:															
GEOLOGICAL		ENGINEERING DESCRIPTION																	
GEOLOGICAL UNIT, GENERIC NAME, ORIGIN, MINERAL COMPOSITION.		FLUID LOSS	WATER	CORE RECOVERY (%)	METHOD	CASING	TESTS	SAMPLES	R.L. (m)	DEPTH (m)	GRAPHIC LOG	CLASSIFICATION SYMBOL	MOISTURE CONDITION	WEATHERING	STRENGTH CLASSIFICATION	SHEAR STRENGTH (kPa)	COMPRESSIVE STRENGTH (MPa)	DEFECT SPACING (mm)	SOIL DESCRIPTION Soil type, minor components, plasticity or particle size, colour.  ROCK DESCRIPTION Substance: Rock type, particle size, colour, minor components. Defects: Type, inclination, thickness, roughness, filling.
Christchurch formation.				100						11		SP	W	MD					
				82	SPT		5/6/10/8/8 /8 N=34			12									
				89															
				100	SPT		4/5/7/9/12 /12 N=40			13									- becoming medium.
				86															
				67	SPT		4/6/8/11/12 /16 N=47			14									
				76															
				78	SPT		4/3/8/8/8 /10 N=34			16									
				86															
				78	SPT		4/7/8/11/13 /15 N=47			17									
			76						18									- Rare shell fragments	
			100	SPT		0/0/0/0/1/1 N=2			19		MH		S					Clayey SILT with rare shell fragments, high plasticity, grey. Wet, soft.	
																		- Shell	
																			Clayey SILT with rare shell fragments, high plasticity, grey stained black with lenses of

T-T DATATEMPLATE.GDT adw

BORELOG BORE LOGS.GPJ 1/8/11



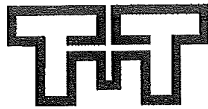
TONKIN & TAYLOR LTD  
BOREHOLE LOG

BOREHOLE No: BH01

Hole Location:

SHEET 3 OF 3

[illegible]



# TONKIN & TAYLOR LTD

## BOREHOLE LOG

BOREHOLE No: BH1  
Hole Location:  
SHEET 1 OF 3

PROJECT: Warners Hotel				LOCATION: Cathedral Square, CHCH				JOB No: 50998																	
CO-ORDINATES		5741842.00 mN 2480695.00 mE		DRILL TYPE: Cable Tool				HOLE STARTED:		17/10/06															
R.L.		approx. 14.6 m		DRILL METHOD:				HOLE FINISHED:		27/10/06															
DATUM						DRILL FLUID: Water		DRILLED BY: McMillans																	
								LOGGED BY: NRG		CHECKED: AFS															
GEOLOGICAL				ENGINEERING DESCRIPTION																					
GEOLOGICAL UNIT, GENERIC NAME, ORIGIN, MINERAL COMPOSITION.				FLUID LOSS	WATER	CORE RECOVERY	METHOD	CASING	TESTS	SAMPLES	R.L. (m)	DEPTH (m)	GRAPHIC LOG	CLASSIFICATION SYMBOL	MOISTURE CONDITION	WEATHERING	STRENGTH/DENSITY CLASSIFICATION	SHEAR STRENGTH (kPa)	COMPRESSION STRENGTH (MPa)	DEFECT SPACING (mm)	SOIL DESCRIPTION Soil type, minor components, plasticity or particle size, colour.  ROCK DESCRIPTION Substance: Rock type, particle size, colour, minor components. Defects: Type, inclination, thickness, roughness, filling.				
Fill														GW								GRAVEL, angular to sub rounded, <75mm dia.			
Alluvium									SPT N=6			1		SP								SAND, medium, clean, brown.			
												GW											fine to medium GRAVEL, rounded		
									SPT N=18			3		GP										medium sandy GRAVEL, sub rounded, <75mm dia.	
									SPT N=13			4		GP											medium to coarse GRAVEL <100mm dia., some sand
									SPT N=18			5													
					SPT N=18			6														- becomes medium gravel <50mm dia.			
					SPT N=7			7																	
					SPT N=32			8		GW												medium to coarse sandy GRAVEL, sub angular, med to coarse grey sand			
																						SILT, some clay, blue-grey			
																						medium to coarse GRAVEL, with minor sand and minor clayey silt, grey			
																						organic SILT with some clay, low plasticity, rootlets, brownish grey			
								9														medium to coarse GRAVEL, grey			
								10														fine to medium SAND, grey			

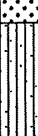









# TONKIN & TAYLOR LTD

## BOREHOLE LOG

BOREHOLE No: BH1  
Hole Location:  
SHEET.....2..... OF.....3.....

PROJECT: Warners Hotel				LOCATION: Cathedral Square, CHCH				JOB No: 50998														
CO-ORDINATES		5741842.00 mN 2480695.00 mE		DRILL TYPE: Cable Tool		HOLE STARTED: 17/10/06																
R.L.		approx. 14.6 m		DRILL METHOD:		HOLE FINISHED: 27/10/06																
DATUM				DRILL FLUID: Water		DRILLED BY: McMillans																
						LOGGED BY: NRG CHECKED: AFS																
GEOLOGICAL				ENGINEERING DESCRIPTION																		
GEOLOGICAL UNIT, GENERIC NAME, ORIGIN, MINERAL COMPOSITION.				FLUID LOSS	WATER	CORE RECOVERY	METHOD	CASING	TESTS	SAMPLES	R.L. (m)	DEPTH (m)	GRAPHIC LOG	CLASSIFICATION SYMBOL	MOISTURE CONDITION	WEATHERING	STRENGTH/DENSITY CLASSIFICATION	SHEAR STRENGTH (kPa)	COMPRESSION STRENGTH (MPa)	DEFECT SPACING (mm)	SOIL DESCRIPTION	
																					Soil type, minor components, plasticity or particle size, colour.	
																				ROCK DESCRIPTION		
																					Substance: Rock type, particle size, colour, minor components.	
																					Defects: Type, inclination, thickness, roughness, filling.	
									SPT N=27			11		ML								sandy SILT, fine sand, brownish grey
									SPT N=19			12		SW								fine to medium SAND, grey, minor organic silt
												13		ML								sandy SILT with trace clay, low plasticity, grey
									SPT N=21					SW								fine to medium SAND, grey
												14										
												15										
									SPT N=32			16										
												17										
									SPT N=2													
												18		SW								fine to medium SAND, grey, trace shell fragments
									SPT N=50+			19		ML								SILT, some sand, minor clay, trace shell fragments, brownish grey
									SPT N=0			20										



TONKIN &amp; TAYLOR LTD

## BOREHOLE LOG

BOREHOLE No: BH1

Hole Location:

SHEET...3... OF...3...

PROJECT: Warners Hotel				LOCATION: Cathedral Square, CHCH				JOB No: 50998													
CO-ORDINATES 5741842.00 mN 2480695.00 mE				DRILL TYPE: Cable Tool				HOLE STARTED: 17/10/06													
R.L. approx. 14.6 m				DRILL METHOD:				HOLE FINISHED: 27/10/06													
DATUM				DRILL FLUID: Water				DRILLED BY: McMillans													
								LOGGED BY: NRG CHECKED: AFS													
GEOLOGICAL				ENGINEERING DESCRIPTION																	
GEOLOGICAL UNIT, GENERIC NAME, ORIGIN, MINERAL COMPOSITION.				FLUID LOSS	WATER	CORE RECOVERY	METHOD	CASING	TESTS	SAMPLES	R.L. (m)	DEPTH (m)	GRAPHIC LOG	CLASSIFICATION SYMBOL	MOISTURE CONDITION	WEATHERING STRENGTH/DENSITY CLASSIFICATION	SHEAR STRENGTH (kPa)	COMPRESSION STRENGTH (MPa)	DEFECT SPACING (mm)	SOIL DESCRIPTION Soil type, minor components, plasticity or particle size, colour.  ROCK DESCRIPTION Substance: Rock type, particle size, colour, minor components. Defects: Type, inclination, thickness, roughness, filling.	
									SPT N=20			21									
												22									
									SPT N=11			23		ML							sandy SILT, veneers of organic silt (brown), rootlets, grey
												24		ML OL MH GP							SILT, veneers of organic silt, rootlets, grey organic SILT, very stiff, rootlets and decomposed organics clayey SILT, roots <10mm dia, grey GRAVEL, medium, sub angular to sub rounded (artesian conditions)
									SPT N=50+			25									
												26		GW							fine to medium sandy GRAVEL, sub rounded, medium sand, brown (artesian conditions)
									SPT N=46			27		GP							medium to cobble size sandy GRAVEL, subangular, fine to medium sand, brown (artesian conditions)
												28									
									SPT N=50+			29		SP							medium gravelly SAND, fine to medium gravel, brown (artesian conditions)
									SPT N=21												
									SPT N=19												END OF BOREHOLE AT 30m



## TONKIN &amp; TAYLOR LTD

## BOREHOLE LOG

BOREHOLE No: BH2

Hole Location:

SHEET 1 OF 3

PROJECT: Warners Hotel				LOCATION: Cathedral Square, CHCH				JOB No: 50998															
CO-ORDINATES 5741848.00 mN 2480730.00 mE				DRILL TYPE: Cable Tool				HOLE STARTED: 30/10/06															
R.L. approx. 14.9 m				DRILL METHOD:				HOLE FINISHED: 3/11/06															
DATUM				DRILL FLUID: Water				DRILLED BY: McMillans															
								LOGGED BY: NRG CHECKED: AFS															
GEOLOGICAL				ENGINEERING DESCRIPTION																			
GEOLOGICAL UNIT, GENERIC NAME, ORIGIN, MINERAL COMPOSITION.				FLUID LOSS	WATER	CORE RECOVERY	METHOD	CASING	TESTS	SAMPLES	R.L. (m)	DEPTH (m)	GRAPHIC LOG	CLASSIFICATION SYMBOL	MOISTURE CONDITION	WEATHERING	STRENGTH/DENSITY CLASSIFICATION	SHEAR STRENGTH (kPa)	COMPRESSIVE STRENGTH (MPa)	DEFECT SPACING (mm)	SOIL DESCRIPTION Soil type, minor components, plasticity or particle size, colour.	ROCK DESCRIPTION Substance: Rock type, particle size, colour, minor components. Defects: Type, inclination, thickness, roughness, filling.	
Fill												1									HARD FILL	1	
Alluvium												2		GW							reinforced CONCRETE slab (basement floor)	2	
												3									fine to medium GRAVEL, sub rounded, some medium to coarse sand, grey	3	
												4		SW							medium to coarse gravelly SAND, grey, gravel fine to medium, rounded to angular	4	
												5										5	
												6									- sand becomes fine to medium	6	
												7											7
												8		GW							fine to coarse sandy GRAVEL, fine to medium sand, grey	8	
												9		GW							fine to coarse GRAVEL, minor fine to medium sand, grey	9	
											10		SW							fine to medium SAND, grey			





TONKIN &amp; TAYLOR LTD

## BOREHOLE LOG

BOREHOLE No: BH2

Hole Location:

SHEET.....2..... OF.....3.....

PROJECT: Warners Hotel				LOCATION: Cathedral Square, CHCH				JOB No: 50998													
CO-ORDINATES 5741848.00 mN 2480730.00 mE				DRILL TYPE: Cable Tool				HOLE STARTED: 30/10/06													
R.L. approx. 14.9 m				DRILL METHOD:				HOLE FINISHED: 3/11/06													
DATUM				DRILL FLUID: Water				DRILLED BY: McMillans													
				LOGGED BY: NRG				CHECKED: AFS													
GEOLOGICAL				ENGINEERING DESCRIPTION																	
GEOLOGICAL UNIT, GENERIC NAME, ORIGIN, MINERAL COMPOSITION.				FLUID LOSS	WATER	CORE RECOVERY	METHOD	CASING	TESTS	SAMPLES	R.L. (m)	DEPTH (m)	GRAPHIC LOG	CLASSIFICATION SYMBOL	MOISTURE CONDITION	WEATHERING	STRENGTH/DENSITY CLASSIFICATION	SHEAR STRENGTH (kPa)	COMPRESSIVE STRENGTH (MPa)	DEFECT SPACING (mm)	SOIL DESCRIPTION Soil type, minor components, plasticity or particle size, colour.
									SPT N=19			11									11
									SPT N=20			12									12
											13										13
									SPT N=46			14									14
											15										15
									SPT N=50+			16									16
											17										17
									SPT N=50+			18									18
											19										19
									SPT N=50+			20									
									SPT N=3				ML								SILT, low plasticity, esturine, grey



## TONKIN &amp; TAYLOR LTD

## BOREHOLE LOG

BOREHOLE No: BH2

Hole Location:

SHEET.....3..... OF.....3.....

PROJECT: Warners Hotel		LOCATION: Cathedral Square, CHCH		JOB No: 50998													
CO-ORDINATES 5741848.00 mN 2480730.00 mE		DRILL TYPE: Cable Tool		HOLE STARTED: 30/10/06													
R.L. approx. 14.9 m		DRILL METHOD:		HOLE FINISHED: 3/11/06													
DATUM		DRILL FLUID: Water		DRILLED BY: McMillans LOGGED BY: NRG CHECKED: AFS													
GEOLOGICAL		ENGINEERING DESCRIPTION															
GEOLOGICAL UNIT, GENERIC NAME, ORIGIN, MINERAL COMPOSITION.	FLUID LOSS	WATER	CORE RECOVERY	METHOD	CASING	TESTS	SAMPLES R.L. (m)	DEPTH (m)	GRAPHIC LOG	CLASSIFICATION SYMBOL	MOISTURE CONDITION	WEATHERING	STRENGTH/DENSITY CLASSIFICATION	SHEAR STRENGTH (MPa)	COMPRESSION STRENGTH (MPa)	DEFECT SPACING (mm)	SOIL DESCRIPTION Soil type, minor components, plasticity or particle size, colour.  ROCK DESCRIPTION Substance: Rock type, particle size, colour, minor components. Defects: Type, inclination, thickness, roughness, filling
						SPT N=0		21		ML							sandy SILT, grey
						SPT N=18		22		SM							silty SAND, fine, estuarine, grey
						SPT N=15		24		OL							organic SILT, non plastic, dark brown, wood (10% by volume)
										OL							organic SILT, black
										SW							fine to medium SAND, grey (artesian conditions)
						SPT N=50+		25		GW							fine to coarse sandy GRAVEL, sub angular to sub rounded, fine to coarse sand, grey (artesian conditions)
								26									
						SPT N=50+		27									
								28									
						SPT N=28		29									
						SPT N=50+											END OF BOREHOLE AT 30m

**Appendix C: Cone Penetrometer Test results (2006)**



## CPT ANALYSIS NOTES




### Soil Type

Interpretation using chart of Robertson & Campanella (1983). This is a simple but well proven interpretation using cone tip resistance ( $q_c$ ) and friction ratio ( $f_R$ ) only. No normalisation for overburden stress is applied. Cone tip resistance measured with the piezocone is corrected with measured pore pressure ( $u_c$ ).

	sand (and gravel)
	silt-sand
	silt
	clay-silt
	clay
	peat

### Liquefaction Screening

The purpose of the screening is to highlight susceptible soils, that is sand and silt-sand in a relatively loose condition. This is not a full liquefaction risk assessment which requires knowledge of the particular earthquake risk at a site and additional analysis. The screening is based on the chart of Shibata and Teparaksa (1988).

	high susceptibility
	medium susceptibility
	low susceptibility

High susceptibility is here defined as requiring a shear stress ratio of 0.2 to cause liquefaction with  $D_{50}$  for sands assumed to be 0.25 mm and for silty sands to be 0.05 mm.

Medium susceptibility is here defined as requiring a shear stress ratio of 0.4 to cause liquefaction with  $D_{50}$  for sands assumed to be 0.25 mm and for silty sands to be 0.05 mm.

Low susceptibility is all other cases.

### Relative Density ( $D_R$ )

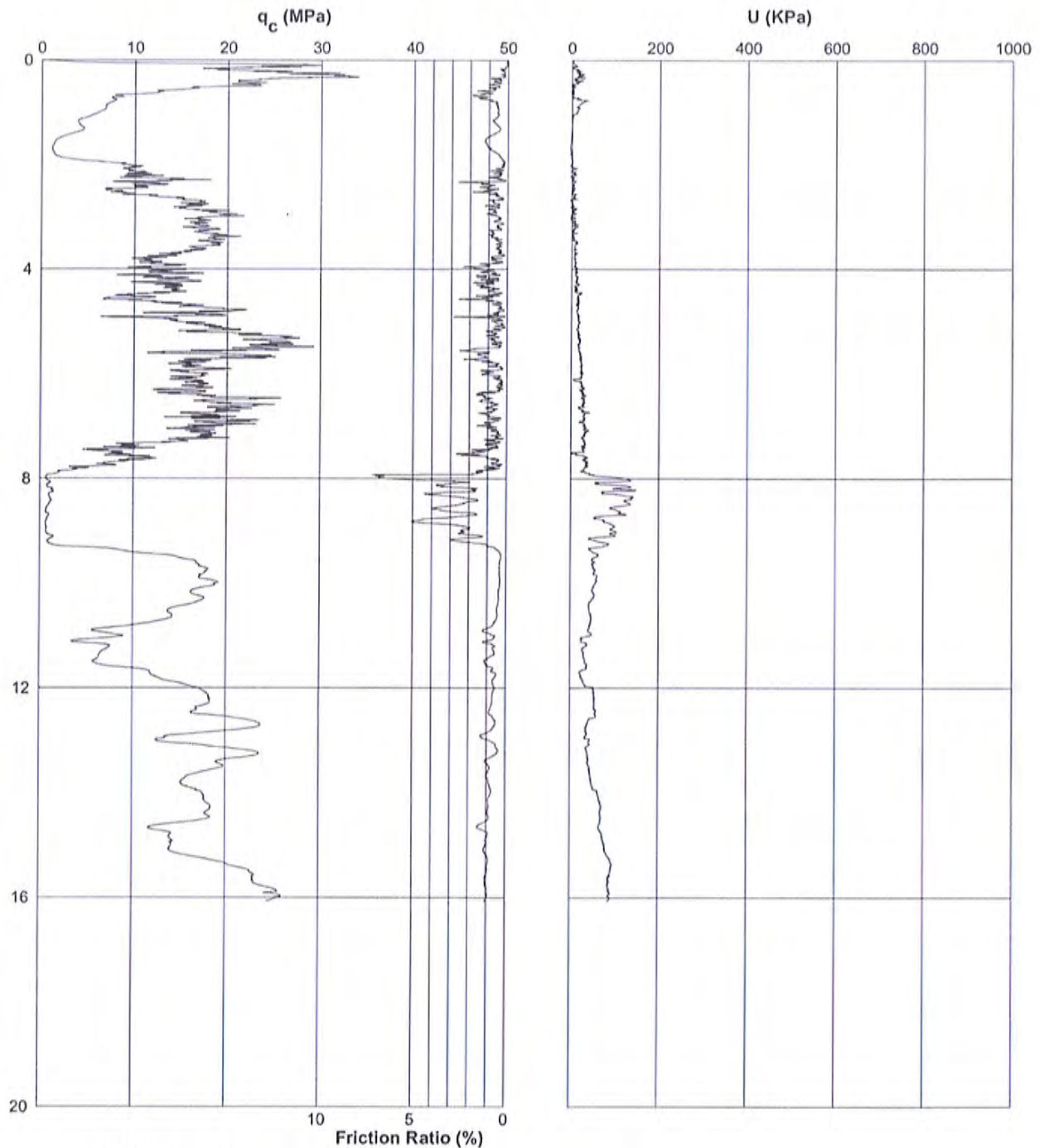
Based on the method of Baldi et. al. (1986) from data on normally consolidated sand.

### Undrained Shear Strength ( $S_u$ )

Derived from the bearing capacity equation using  $S_u = (q_c - \sigma_{vo})/15$ .



# PIEZOCONE PENETROMETER TEST (CPTU) REPORT



Job No: 4389

CPT No: 001

Project: Tonkin & Taylor Ltd

Location: Warners Hotel, CHCH Central

Date: 24/10/06

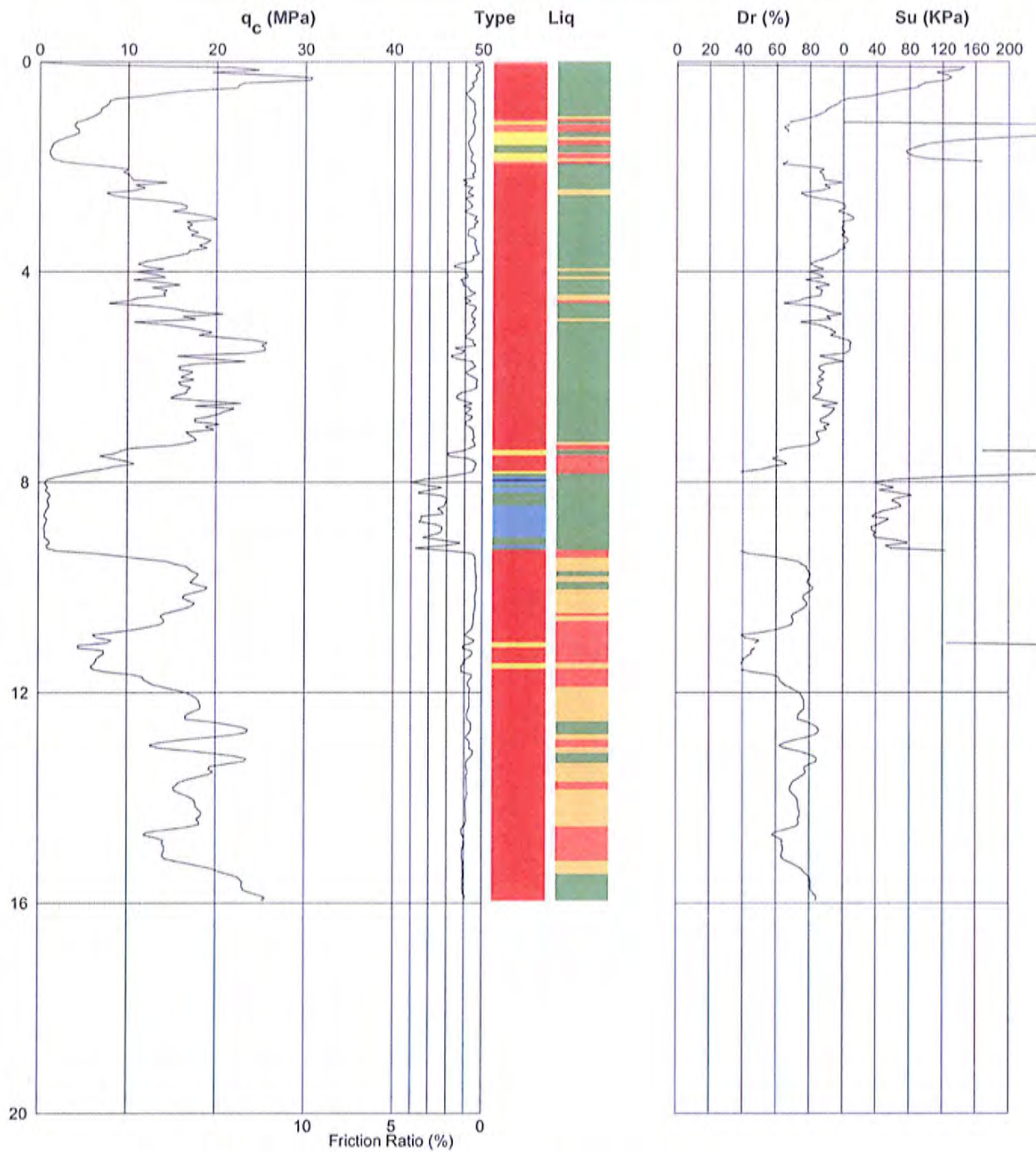
Operator: D Keown

Remark:

**SITE INVESTIGATION**

[www.site-investigation.co.nz](http://www.site-investigation.co.nz)

# PIEZOCONE PENETROMETER TEST (CPTU) INTERPRETIVE REPORT



Job No: 4389

CPT No: 001

Project: Tonkin & Taylor Ltd

Location: Warners Hotel, CHCH Central

Date: 24/10/06

Operator: D Keown

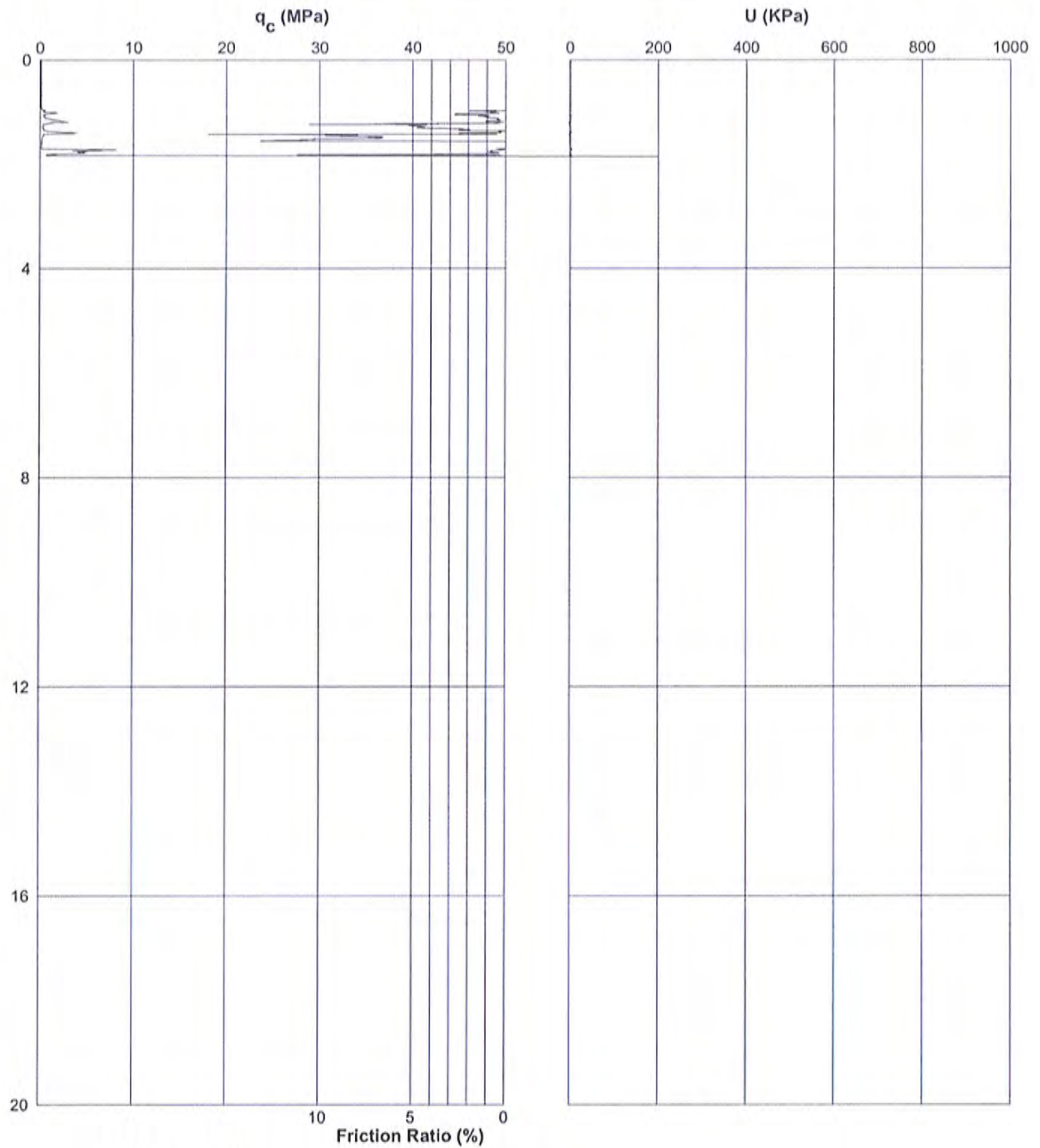
Remark:

**SITE INVESTIGATION**

[www.site-investigation.co.nz](http://www.site-investigation.co.nz)



# PIEZOCONE PENETROMETER TEST (CPTU) REPORT



Job No: 4389

CPT No: 002

Project: Tonkin & Taylor Ltd

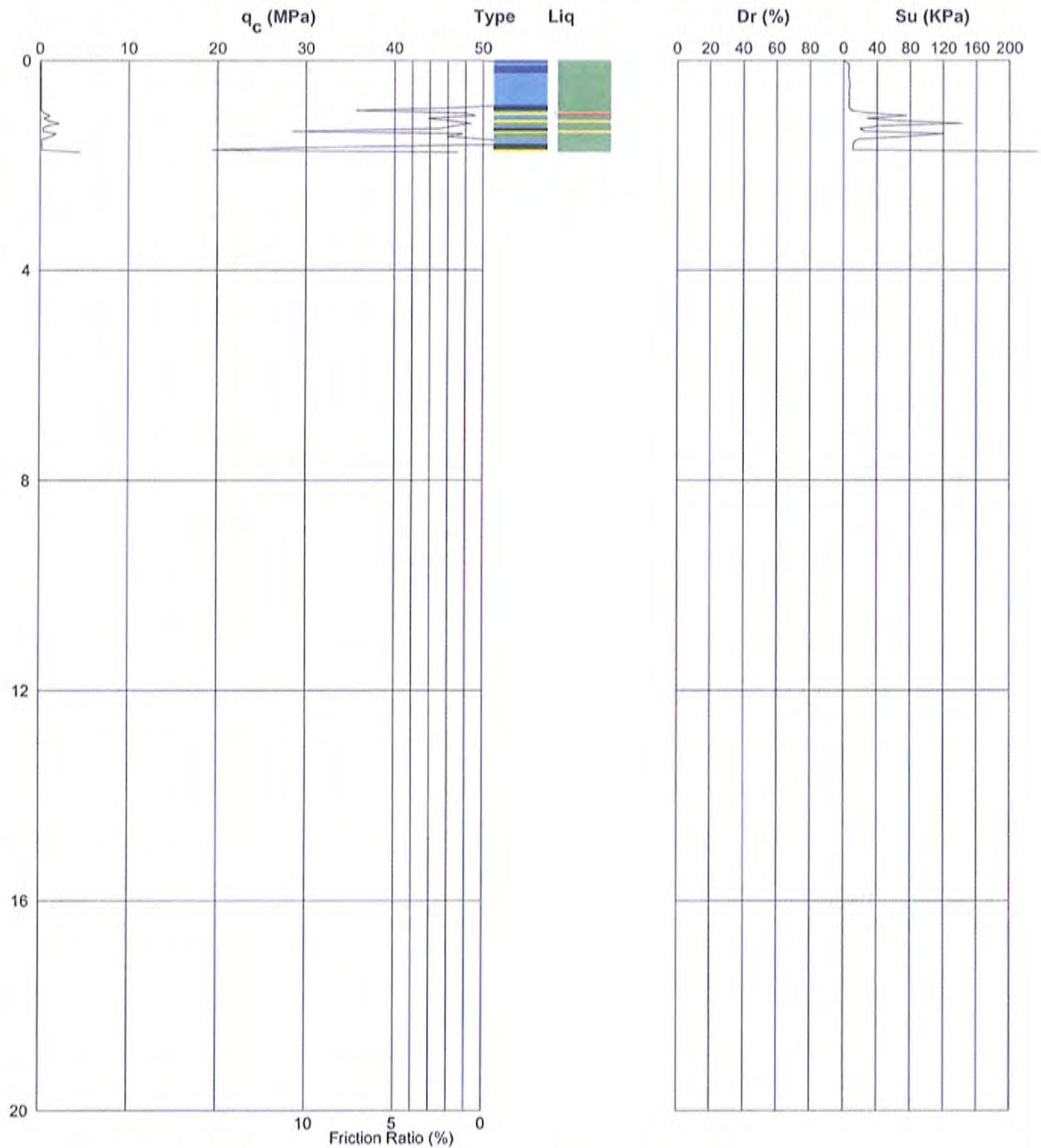
Location: Warners Hotel, CHCH Central

Date: 24/10/06

Operator: D Keown

Remark: Hand Cleared 1.2mbgl

# PIEZOCONE PENETROMETER TEST (CPTU) INTERPRETIVE REPORT



Job No: 4389

CPT No: 002

Project: Tonkin & Taylor Ltd

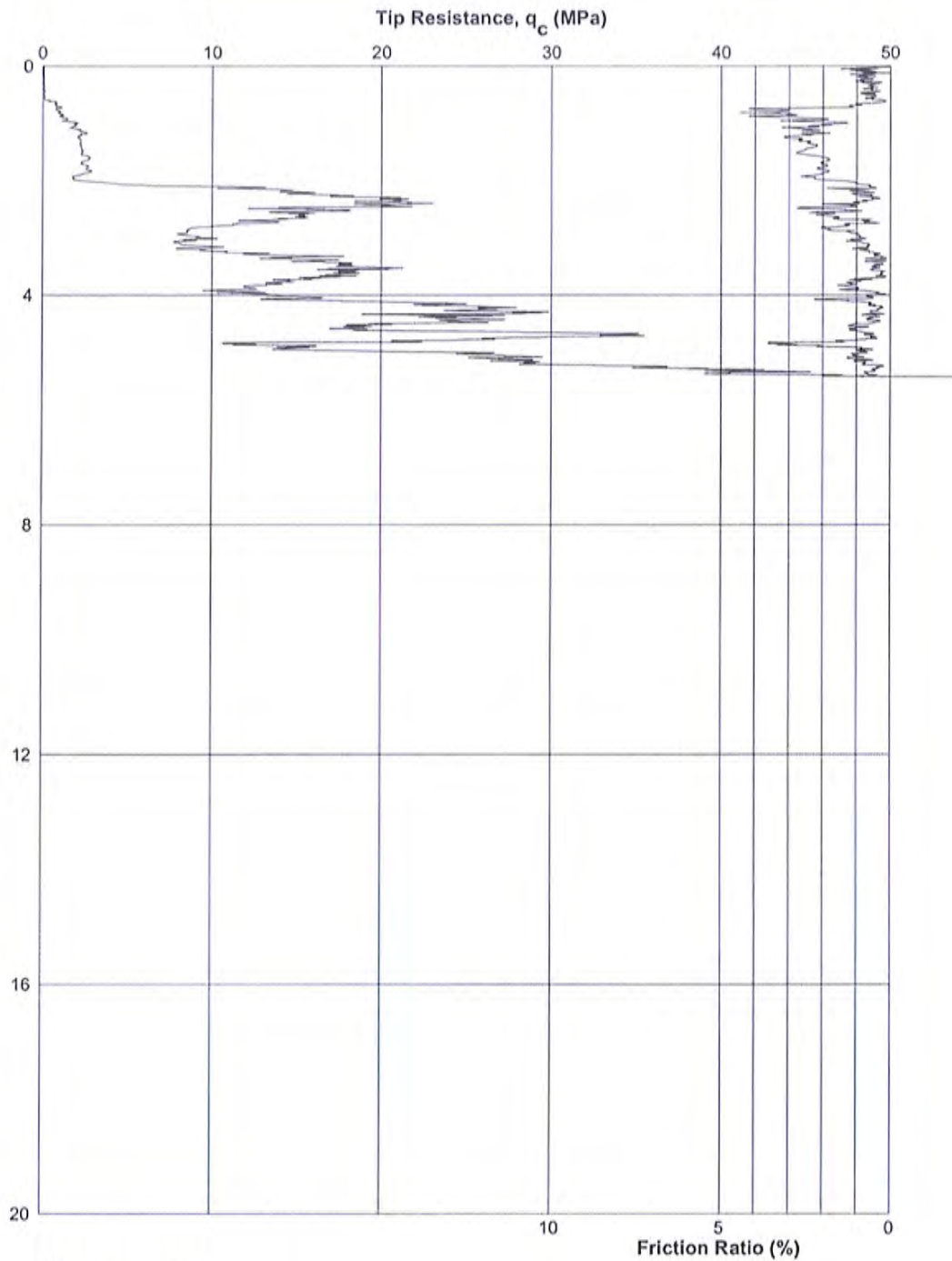
Location: Warners Hotel, CHCH Central

Date: 24/10/06

Operator: D Keown

Remark: Hand Cleared 1.2mbgl

## STANDARD CONE PENETROMETER TEST (CPT) REPORT



Job No: 4389

CPT No: 002r

Project: Tonkin &amp; Taylor Ltd

Location: Warners Hotel, CHCH Central

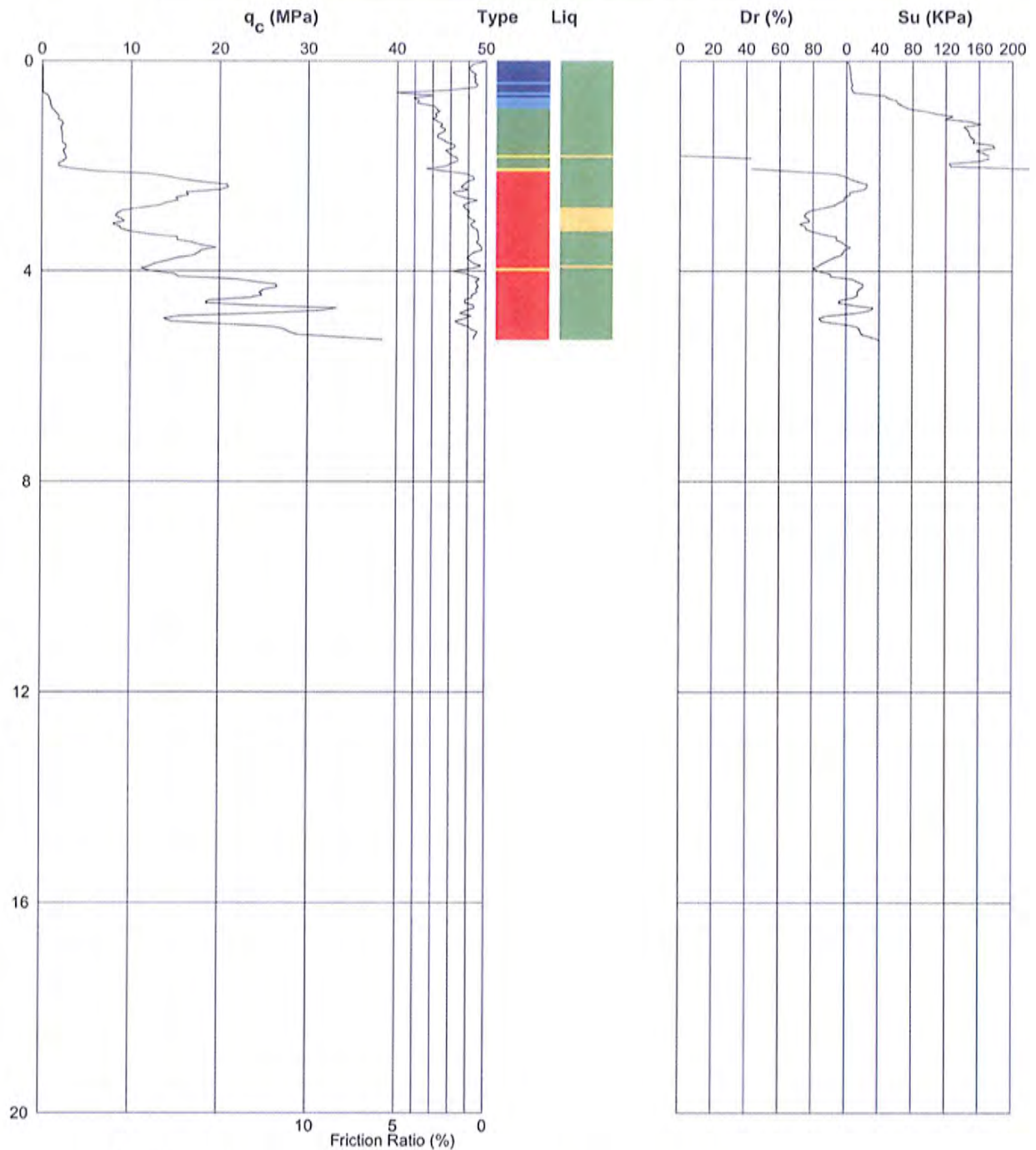
Date: 14/11/06

Operator: D Keown

Remark: Hand cleared to 1.2mbgl +  
back filled



## STANDARD CONE PENETROMETER TEST (CPT) INTERPRETIVE REPORT



Job No: 4389

CPT No: 002r

Project: Tonkin &amp; Taylor Ltd

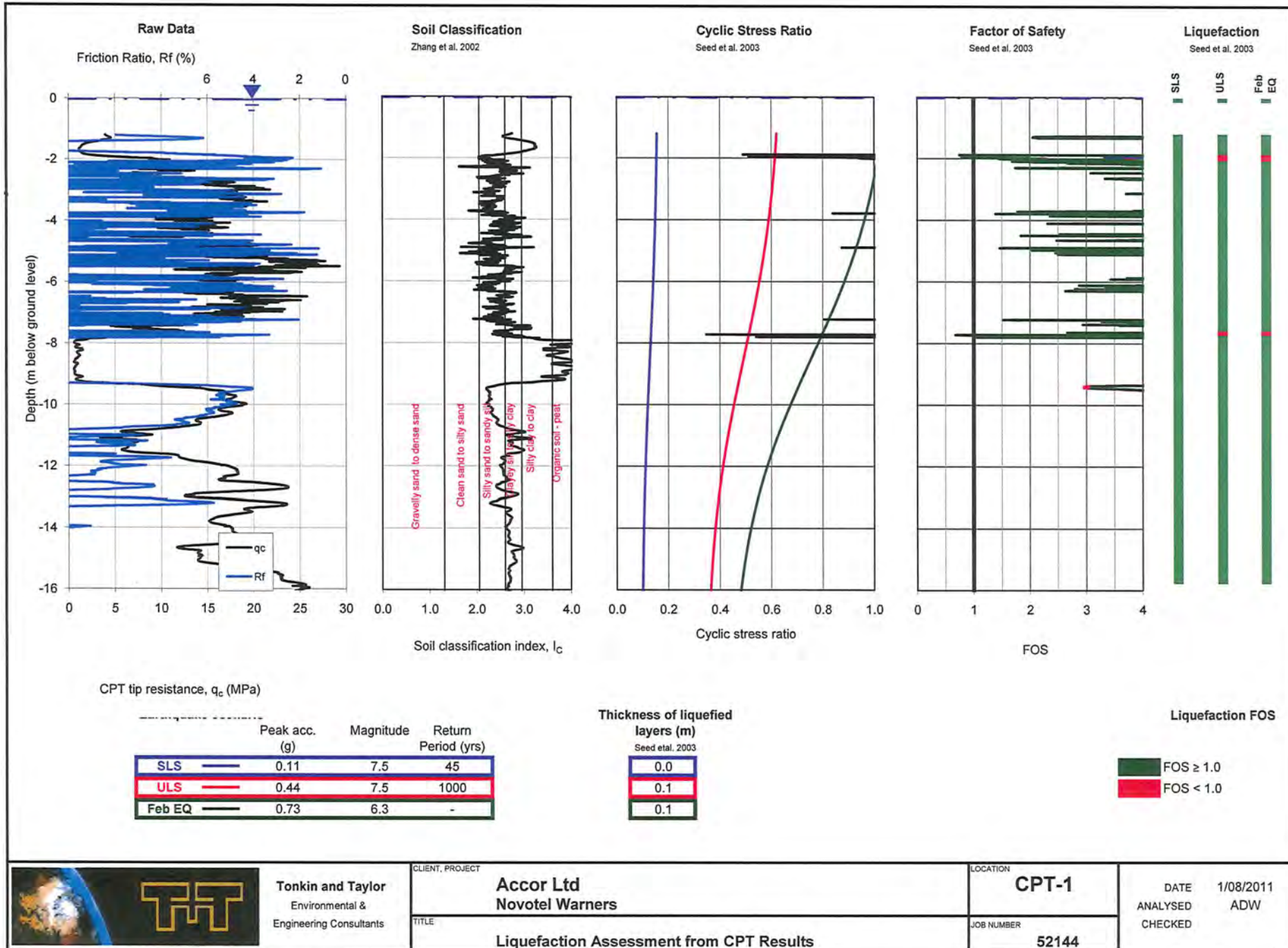
Location: Warners Hotel, CHCH Central

Date: 14/11/06

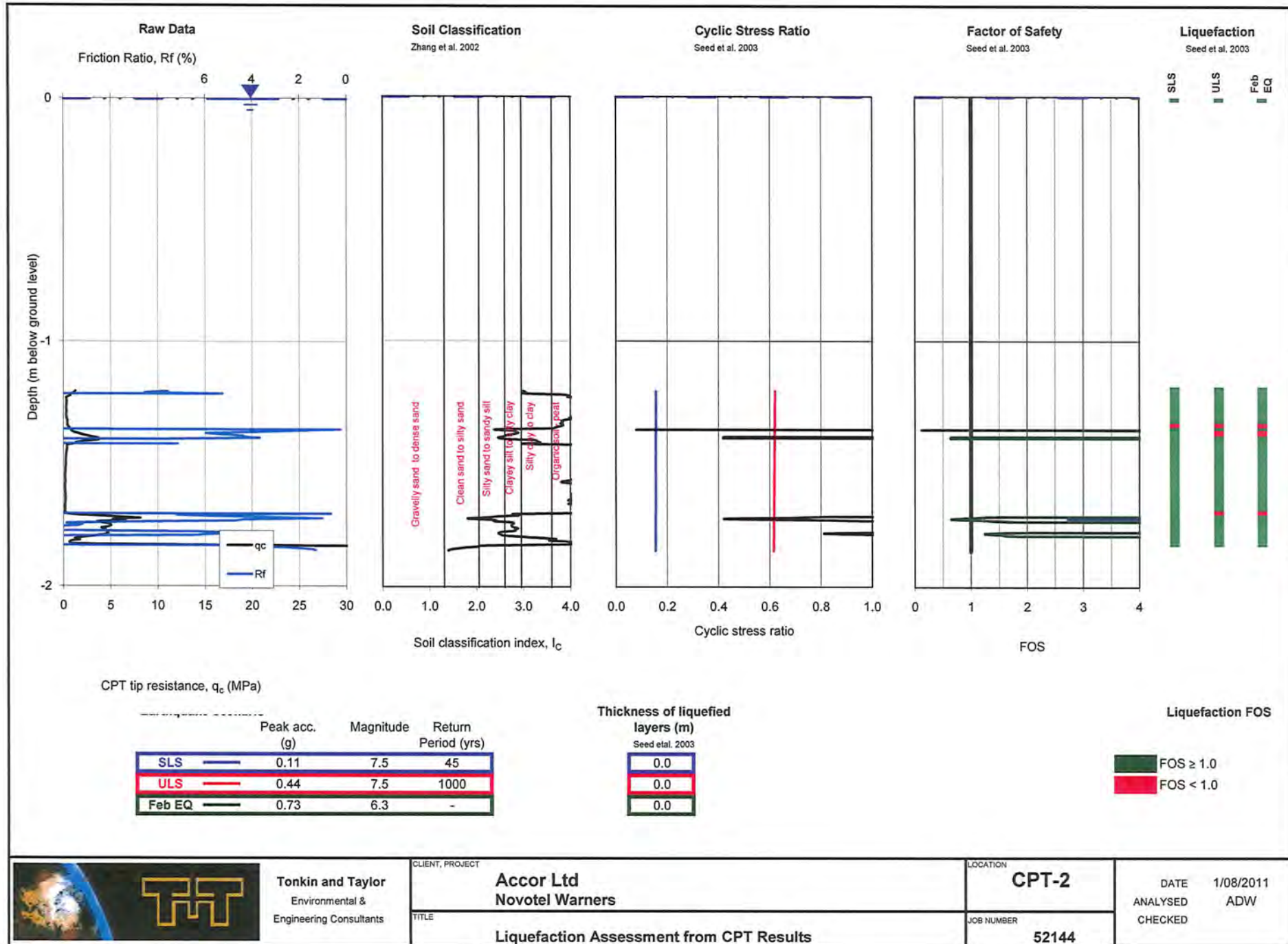
Operator: D Keown

Remark: Hand cleared to 1.2mbgl +  
back filled**SITE INVESTIGATION**[www.site-investigation.co.nz](http://www.site-investigation.co.nz)

## **Appendix D:        Liquefaction analysis**







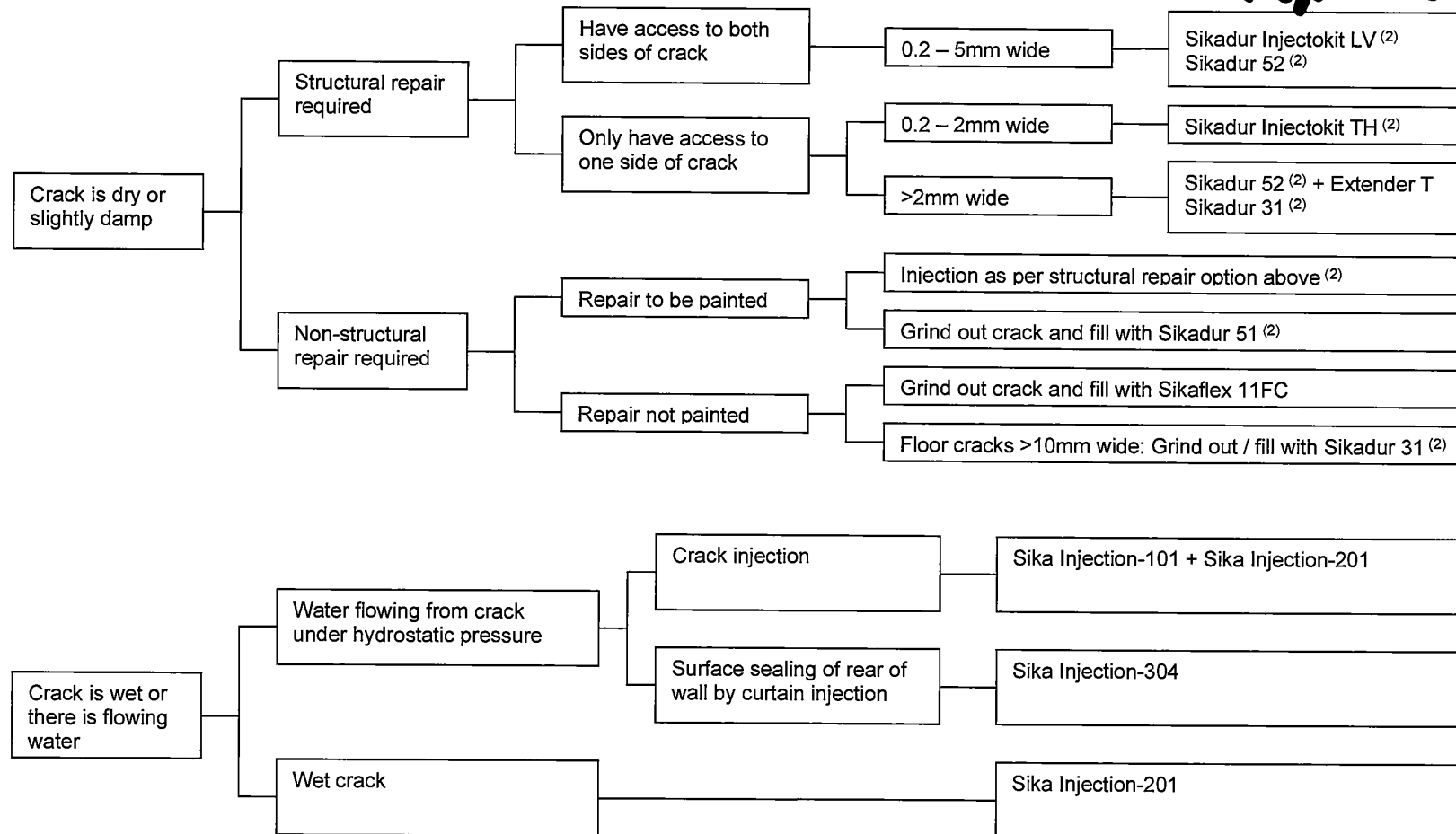
# APPENDIX H

## Sika Epoxy Injection Specification



*Sika  
structural  
repairs*

### Post-earthquake repair of cracks in concrete structures



#### Notes:

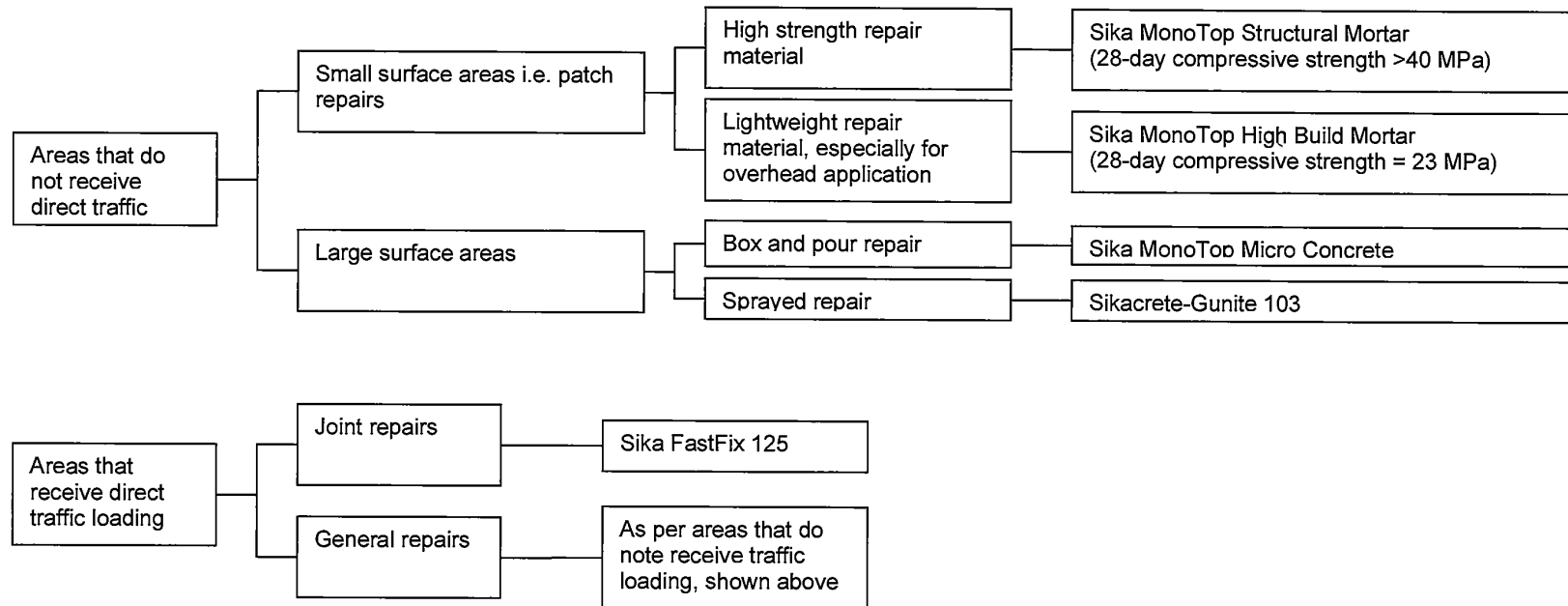
1. This information is provided to assist in choosing the best-suited product for different crack repair situations. It is provided as a guide only. It is, by its nature, very general, and cannot cover all situations. All repair products shall be chosen based on a thorough understanding of the structural requirements and installed in accordance with the information provided on the relevant Product Data Sheets. For assistance please contact your local Sika Technical Representative.
2. The repairs products marked <sup>(2)</sup> are rigid and should only be used in stable, non-moving cracks.





# Structural repairs

## Post-earthquake repair of spalled concrete



### Notes:

1. This information is provided to assist in choosing the best-suited product for the repair of concrete that has spalled off due to seismic loading. It is not intended to be used for situations where spalling has resulted from reinforcement corrosion, chemical attack or other disintegration mechanisms. It is provided as a guide only. It is, by its nature, very general, and cannot cover all situations. All repair products shall be chosen based on a thorough understanding of the structural requirements and installed in accordance with the information provided on the relevant Product Data Sheets. For assistance please contact your local Sika Technical Representative.



**SPECIFICATION FOR CRACK INJECTION USING SIKADUR INJECTOKIT-LV**

**PRODUCTS:** 5 Minute Epoxy  
Sikadur UA  
Sikadur Injectokit-LV

(The current data sheet is dated 02/08)  
(The current data sheet is dated 02/08)  
(The current data sheet is dated 08/09)

**1 General**

- 1.1 This technical specification is to be read in conjunction with the project Contract Documents and Specification.
- 1.2 All work to be carried out in accordance with the current Sika (NZ) Ltd data sheets.

**2 Surface preparation**

- 2.1 All concrete surfaces must be clean and free from any loosely adhering particles, or contaminants such as dirt, oil, dust, grease, etc.
- 2.2 The cracks must be blown out with oil-free, dry compressed air.

**3 Application of the surface sealant**

- 3.1 5 Minute Epoxy or Sikadur UA CONCRETE FIX can be used as the surface sealant, depending on the waiting period between application of the surface sealant and injection.
- 3.2 Immediately after mixing, apply a small amount of compound to the back of each nipple making sure that the valve will not be blocked, and place the nipple over the crack. (Ensure that the valve is centred over the crack.)
- 3.3 Nipples should be placed between 200 mm and 500 mm apart dependent on crack size.
- 3.4 Additional sealant should be applied onto the flange of the nipple to ensure a resin tight seal to the substrate.
- 3.5 Surface sealant should be knifed into the crack between nipples to ensure a resin tight seal.
- 3.6 Continue the sealant 50 mm beyond the end of the line of the visible crack.
- 3.7 Application of the injection system may be commenced as soon as the surface sealant has fully hardened.

**4 Injection of the Sikadur Injectokit-LV epoxy resin**

- 4.1 Hit the side of the capsule near the base with a hammer 2 or 3 times on different sides to break the internal glass container of hardener. (The glass can be heard moving when broken.)
- 4.2 To mix the resin, invert the cartridge 20-30 times slowly. Do not shake vigorously otherwise air will be incorporated.
- 4.3 Use the mixed material within the usable life.
- 4.4 Pierce the foil seal in the threaded end of the cartridge.
- 4.5 Screw the Sikadur Injectokit-LV hose onto the cartridge.
- 4.6 Ensure that the rubber 'O' ring is in place on the cartridge.



# Specification

- 4.7 Do not over tighten the fitting as this may distort the 'O' ring.
- 4.8 Place the cartridge into a standard sealant gun.
- 4.9 Push the free end of the Sikadur Injectokit-LV hose onto the first (lowest) nipple and tighten down the locking cap. Do not over tighten.
- 4.10 Insert an air release pin into the next nipple above the injection point. (Do not start pumping until the air release pin is inserted to open the non return valve and release trapped air.)
- 4.11 Commence pumping slowly, do not use excessive pressure.
- 4.12 When resin appears at the nipple next to the injection point:
  - (a) stop pumping
  - (b) release the pressure on the injection gun
  - (c) remove the air release pin
  - (d) unscrew the cap and with a twisting movement pull off the Sikadur Injectokit-LV hose.
- 4.13 Attach the Sikadur Injectokit-LV hose to the next nipple.
- 4.14 Insert air release pin in nipple beyond and recommence pumping.
- 4.15 Repeat the process until the entire length of crack has been injected.
- 4.16 On completion of pumping, the last cartridge can be left connected and pressurised slightly to allow for possible seepage into deep seated cracks.

## 5 Making good

- 5.1 After the Sikadur Injectokit-LV injection resin has set, remove the nipples. These can be knocked off with a hammer.
- 5.2 Make good any holes or voids with the selected surface sealant.
- 5.3 The existing surface sealant can then be removed by either grinding or heating with a hot air gun and scraping the surface until the original substrate profile is restored.

## 6 Cleaning

- 6.1 Tools and application equipment should be cleaned using Sika Colma Cleaner.

Note: This outline procedure details the key components of the work required. For specific details regarding surface preparation, mixing of the products and application, refer to the product data sheet.





**SPECIFICATION FOR CRACK INJECTION USING SIKADUR INJECTOKIT-TH**

**PRODUCTS:** 5 Minute Epoxy  
Sikadur UA  
Sikadur Injectokit-TH

(The current data sheet is dated 02/08)  
(The current data sheet is dated 02/08)  
(The current data sheet is dated 08/09)

**1 General**

- 1.1 This technical specification is to be read in conjunction with the project Contract Documents and Specification.
- 1.2 All work to be carried out in accordance with the current Sika (NZ) Ltd data sheets.

**2 Surface preparation**

- 2.1 All concrete surfaces must be clean and free from any loosely adhering particles, or contaminants such as dirt, oil, dust, grease, etc.
- 2.2 The cracks must be blown out with oil-free, dry compressed air.

**3 Application of the surface sealant**

- 3.1 5 Minute Epoxy or Sikadur UA CONCRETE FIX can be used as the surface sealant, depending on the waiting period between application of the surface sealant and injection.
- 3.2 Immediately after mixing, apply a small amount of compound to the back of each nipple making sure that the valve will not be blocked, and place the nipple over the crack. (Ensure that the valve is centred over the crack.)
- 3.3 Nipples should be placed between 200 mm and 500 mm apart dependent on crack size. (Where cracks can be sealed on one side only, nipples should be placed at centres which are 80% of the depth to which the resin is required to penetrate.)
- 3.4 Additional sealant should be applied onto the flange of the nipple to ensure a resin tight seal to the substrate.
- 3.5 Surface sealant should be knifed into the crack between nipples to ensure a resin tight seal.
- 3.6 Continue the sealant 50 mm beyond the end of the line of the visible crack.
- 3.7 Application of the injection system may be commenced as soon as the surface sealant has fully hardened.



#### 4 Injection of the Sikadur Injectokit-TH epoxy resin

- 4.1 Cut the top off the conical nozzle.
- 4.2 Insert T-shaped rod and turn clockwise to engage stirring head in cartridge.
- 4.3 Push rod down the full length of the cartridge to break the membrane separating the resin and hardener.
- 4.4 Pump up and down 30 to 40 times to mix resin and hardener.
- 4.5 Turn the T-shaped rod anticlockwise to disengage and then remove.
- 4.6 Do not shake.
- 4.7 Unscrew the conical nozzle and discard.
- 4.8 Use the mixed material within the usable life.
- 4.9 Screw the Sikadur Injectokit-TH hose onto the cartridge.
- 4.10 Ensure that the rubber 'O' ring is in place on the cartridge.
- 4.11 Do not over tighten the fitting as this may distort the 'O' ring.
- 4.12 Place the cartridge into a standard sealant gun.
- 4.13 Push the free end of the Sikadur Injectokit-TH hose onto the nipple positioned over the widest point of the crack and tighten down the locking cap. Do not over tighten.
- 4.14 Insert an air release pin into the nipple adjacent to the injection point. (Do not start pumping until the air release pin is inserted to open the non return valve and release trapped air.)
- 4.15 Commence pumping slowly, do not use excessive pressure.
- 4.16 When resin appears at the nipple next to the injection point:
  - (a) stop pumping
  - (b) release the pressure on the injection gun
  - (c) remove the air release pin
  - (d) unscrew the cap and with a twisting movement pull off the Sikadur Injectokit-TH hose.
- 4.17 Attach the Sikadur Injectokit-TH hose to the next nipple.
- 4.18 Insert air release pin in nipple beyond and recommence pumping.
- 4.19 Repeat the process until the entire length of crack has been injected.
- 4.20 On completion of pumping, the last cartridge can be left connected and pressurised slightly to allow for possible seepage into deep seated cracks.

#### 5 Making good

- 5.1 After the Sikadur Injectokit-TH injection resin has set, remove the nipples. These can be knocked off with a hammer.
- 5.2 Make good any holes or voids with the selected surface sealant.
- 5.3 The existing surface sealant can then be removed by either grinding or heating with a hot air gun and scraping the surface until the original substrate profile is restored.

#### 6 Cleaning

- 6.1 Tools and application equipment should be cleaned using Sika Colma Cleaner.

Note: This outline procedure details the key components of the work required. For specific details regarding surface preparation, mixing of the products and application, refer to the product data sheet.



**SPECIFICATION FOR CRACK INJECTION USING SIKADUR 52**

**PRODUCTS:** Sikadur 31  
Sikadur 52

(The current data sheet is dated 05/04)  
(The current data sheet is dated 07/01)

**1 General**

- 1.1 This technical specification is to be read in conjunction with the project Contract Documents and Specification.
- 1.2 All work to be carried out in accordance with the current Sika (NZ) Ltd data sheets.

**2 Outline Procedure**

- 2.1 Crack widths between 0.2mm and 5mm may be successfully injected.
- 2.2 All concrete surfaces must be clean and free from any loosely adhering particles, or contaminants such as dirt, oil, dust, grease, etc.
- 2.3 The cracks must be blown out with oil-free, dry compressed air.
- 2.4 Use Sikadur 31 to seal off the crack and fix the Sika Injection Flanges over the cleaned and prepared cracks at 300mm to 500mm intervals.
- 2.5 Inject epoxy into the cracks in accordance with the procedure on the Sikadur 52 data sheet.

**Note:** This outline procedure details the key components of the work required. For specific details regarding surface preparation, mixing of the products and application, refer to the product data sheet.





**PRODUCTS:**      **Sika MonoTop Primer**                      (The current data sheet is dated 07/07)  
                          **Sika MonoTop Structural Mortar**      (The current data sheet is dated 07/07)

- 1.1 This technical specification is to be read in conjunction with the project Contract Documents and Specification.
- 1.2 All work to be carried out in accordance with the current Sika (NZ) Ltd data sheets.

- 2.1 Sawcut a nominal 10mm cut around the area to be repaired to eliminate over-break and feather edging. (Feather edges to repairs are not permitted.) Smooth saw cut edges should be roughened to improve the bond between the repair and the existing concrete.
- 2.2 Break out and remove all defective/unsound concrete (as designated by the Supervising Officer) using suitable mechanical means that will avoid unnecessary vibration and damage to the structure.
- 2.3 Concrete must not be removed from behind reinforcing bars without the permission of the Supervising Officer. When it is necessary to remove concrete from behind reinforcement the extent of breakout should be limited to 15mm or the original bar diameter whichever is the greater unless directed otherwise by the Supervising Officer.
- 2.4 Any rusting steel reinforcement should be fully exposed to approximately 25mm beyond the corroding length and thoroughly cleaned by abrasive cleaning to standard SA 2.5 of AS1627.9. It is important that rust flakes are removed and corroded pits in the surface of the steel are cleaned out of residue.
- 2.5 All surfaces (concrete and steel) must be clean and free from loosely adhering particles or any surface contamination such as dirt, dust, grease, oil, etc.
- 2.6 Where corrosion has resulted in the loss of more than 10% of the original cross sectional areas of the steel the advice of the Engineer should be sought with reference to repair or replacement.

- 3.1 Within 24 hours of abrasive cleaning, apply a uniform layer of Sika MonoTop Primer approximately 1mm thick to all de-rusted and cleaned reinforcement.
- 3.2 Allow to dry (for 4 – 5 hours at 20°C) prior to application of the bonding bridge or to other works proceeding.
- 3.3 All exposed steel surfaces must be uniformly coated, including behind bars where applicable. Where reinforcement remains firmly embedded in sound alkaline concrete lap the Sika MonoTop Primer on to the adjacent concrete by approximately 10mm.



#### 4 Bonding Bridge

- 4.1 Wet down the prepared substrate until the concrete is fully saturated with water.
- 4.2 Once the surface has returned to a matt damp appearance (saturated surface dry condition) apply a second 1mm thick coat of Sika MonoTop Primer to the reinforcement, and apply one (1) coat of Sika MonoTop Primer nominally 1 mm thick to the repair interface. Work the MonoTop Primer well into the surface using a brush or broom.
- 4.3 The subsequent repair mortar must be applied whilst the Sika MonoTop Primer bonding bridge is still wet. If the bond coat does dry before application of the repair mortar, then Sika MonoTop Primer must be reapplied.

#### 5 Repair Mortar

- 5.1 While the bonding coat is still tacky, pack the Sika MonoTop Structural Mortar repair mortar into the cavity to restore line and level. Use a placing rather than a rendering technique to fill all voids and ensure that thorough compaction is achieved. Start by forcing the Sika MonoTop Structural Mortar against the edge of the repair and progressively work towards the centre.
- 5.2 Sika MonoTop Structural Mortar should not be used when the rebuild thickness is less than 5mm and should not be applied in a single layer thicker than 30mm. For repairs in excess of 30mm deep, apply the repair mortar in layers, ensuring each previous layer is sufficiently hardened before proceeding. If the previous layer has been in place for 48 hours or more before placing the subsequent layer, scabble the surface of the mortar, dampen with water and apply a Sika MonoTop Primer bonding coat in accordance with Section 4 above before proceeding.
- 5.3 Steel trowel the final layer if a smooth tight finish is required.
- 5.4 An adequate curing method must be employed to keep the rebuild damp for at least seven (7) days.

Note: This outline procedure details the key components of the work required. For specific details regarding surface preparation, mixing of the products and application, refer to the product data sheet.



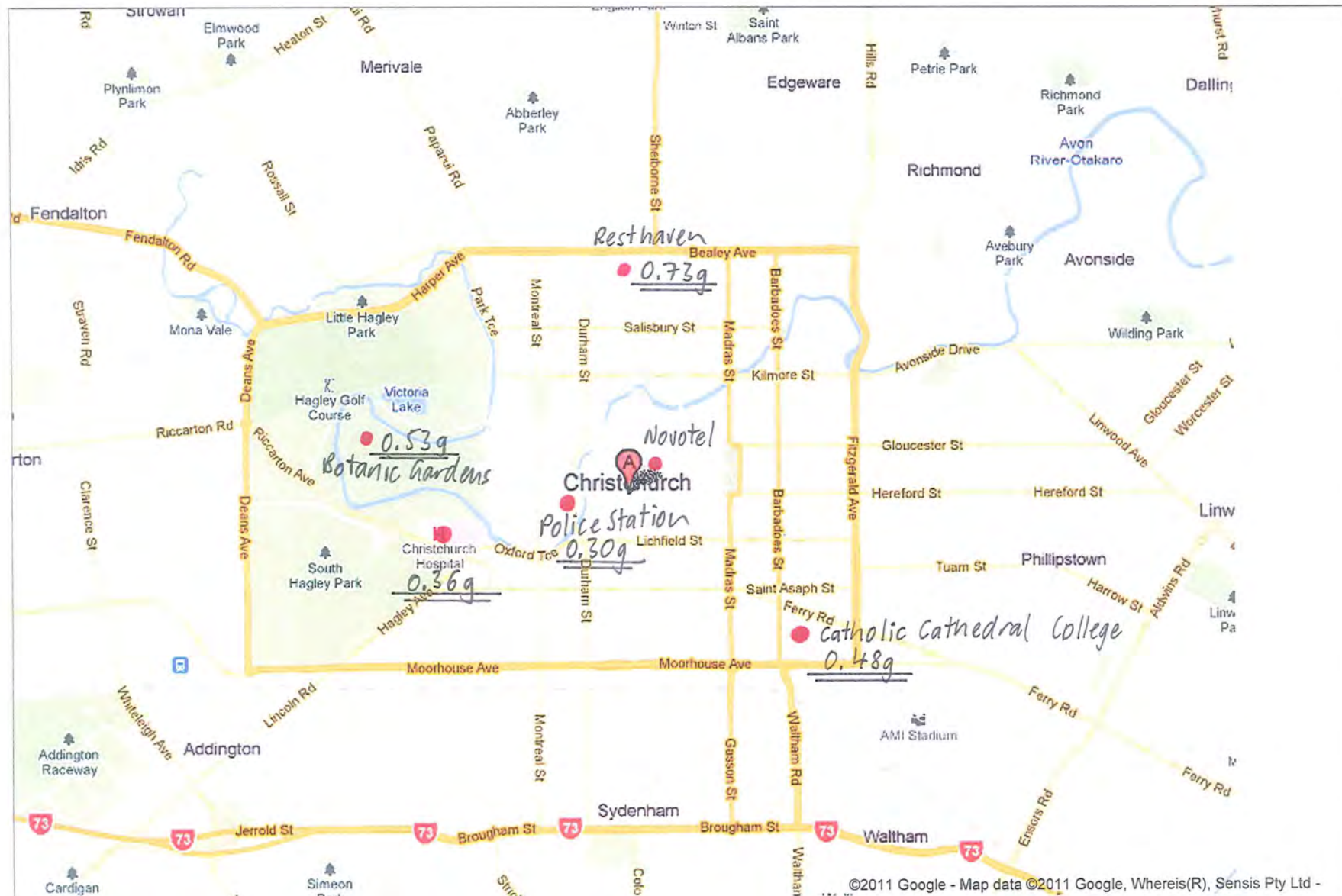
# APPENDIX I

## Peak Ground Accelerations for Christchurch CBD





Christchurch, Canterbury - Google Maps



Peak Ground Accelerations (PGA's) From 22/2/11 Earthquake From GNS Data

# APPENDIX J

## Building Level Survey Results



**LBA - Ash**

---

**From:** Chris Walker <Chris.Walker@eliotsinclair.co.nz>  
**Sent:** Friday, 15 July 2011 11:22 a.m.  
**To:** LBA - Ash  
**Subject:** [# - 339164] Novotel Cathedral Square, floor levels and verticality.  
**Attachments:** 110713 Novotel verticality rep.pdf; 110713 Novotel floor levels.pdf

Hi Ash,

Find attached our report and plans for the above survey. Note our comments re positions A and B on the reports. We also noted onsite that there is considerable *Building Character* in the east wall ( Press Lane) panels (positions C and D) of the building, affecting the reliability of a vertical line.

We note the scope of the work has been altered as a result of onsite discussions with you. This has entailed more work than anticipated and we will review the cost to date, before invoicing.

Please call us if you require additional information or clarification of data.

Regards

*Chris Walker* (BSurv)  
 Registered Professional Surveyor  
 Licenced Cadastral Surveyor

[chris.walker@eliotsinclair.co.nz](mailto:chris.walker@eliotsinclair.co.nz)

**Eliot Sinclair**  
 surveyors | engineers | planners

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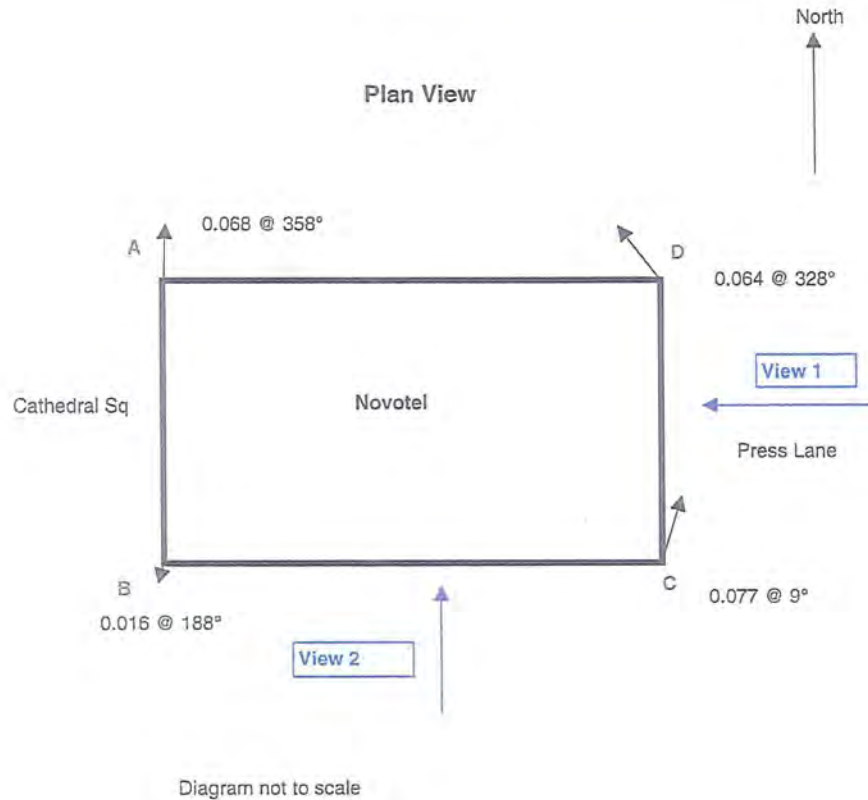
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Verticality Survey  
Warners Novotel, Cathedral Square,  
Christchurch.

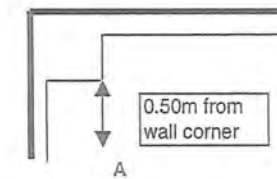
ESP Job No. 339164  
Date 14/07/2011  
Date of Survey 13/07/2011

Plan View



#### Survey Locations at A and B (mirror image)

We note that positions A and B are fixed by survey adjacent to internal building features and are therefore subject to construction tolerances relative to vertical structural elements.



#### Survey Locations at C and D (mirror image)

Positions C and D have been fixed by survey at external wall panel corners facing Press Lane.



**Eliot Sinclair**  
surveyors | engineers | planners

### Coordinates and Offsets

Warners Novotel, Cathedral Square, Christchurch.

ESP Job No. 339164  
Date 14/07/2011  
Date of Survey 13/07/2011

Report prepared for Lewis Bradford Consulting Ltd

View 1 -from east to west						View 1 -from east to west					
At A						At D					
Pt No.	Offset(m)	Elevation(m)	Northing(m)	Easting(m)	Code	Pt No.	Offset(m)	Elevation(m)	Northing(m)	Easting(m)	Code
1640	0.000	32.882	806697.171	392769.398	lv15lhs	3000	0.000	23.319	806699.631	392801.835	CNRL2a
1641	0.010	35.942	806697.181	392769.400	lv16lhs	3001	0.017	25.858	806699.648	392801.818	CNRL2b
1642	0.008	38.983	806697.179	392769.391	lv17lhs	3002	0.022	26.941	806699.653	392801.813	CNRL3a
1643	0.001	42.043	806697.172	392769.392	lv18lhs	3003	0.016	29.007	806699.647	392801.804	CNRL3b
1644	0.044	45.089	806697.215	392769.395	lv19lhs	3004	0.025	30.329	806699.656	392801.798	CNRL4a
1645	0.048	48.123	806697.219	392769.391	lv110lhs	3005	0.030	32.592	806699.661	392801.803	CNRL4b
1646	0.057	51.173	806697.228	392769.382	lv111lhs	3006	0.030	34.721	806699.661	392801.801	CNRL5a
1647	0.068	54.223	806697.239	392769.396	lv112lhs	3007	0.033	35.681	806699.664	392801.802	CNRL5b
						3008	0.031	36.190	806699.662	392801.801	CNRL6a
						3009	0.032	38.650	806699.663	392801.801	CNRL6b
						3010	0.033	39.513	806699.664	392801.804	CNRL7a
						3011	0.033	41.439	806699.664	392801.806	CNRL7b
						3012	0.045	42.475	806699.676	392801.811	CNRL8a
						3013	0.046	44.791	806699.677	392801.814	CNRL8b
						3014	0.045	45.430	806699.676	392801.813	CNRL9a
						3015	0.045	47.551	806699.676	392801.810	CNRL9b
						3016	0.048	48.712	806699.679	392801.808	CNRL10a
						3017	0.052	50.797	806699.683	392801.812	CNRL10b
						3018	0.054	51.636	806699.685	392801.809	CNRL11a
						3019	0.054	53.677	806699.685	392801.813	CNRL11b
						3020	0.053	54.938	806699.684	392801.805	CNRL12a
						3021	0.054	57.199	806699.685	392801.801	CNRL12b

## View 1 -from east to west

## SW Corner

At B

Pt No.	Offset(m)	Elevation(m)	Northing(m)	Easting(m)	Code
1630	0.000	32.904	806684.611	392769.452	L5RHS
1631	0.004	35.963	806684.615	392769.458	L6RHS
1632	-0.006	39.015	806684.605	392769.440	L7RHS
1633	0.009	42.074	806684.620	392769.439	L8RHS
1634	-0.009	45.112	806684.602	392769.394	L9RHS
1635	-0.014	48.157	806684.597	392769.431	L10RHS
1636	-0.028	51.210	806684.583	392769.503	L11RHS
1637	-0.016	54.243	806684.595	392769.450	L12RHS

## View 1 -from east to west

## SE Corner

At C

Pt No.	Offset(m)	Elevation(m)	Northing(m)	Easting(m)	Code
2000	0.000	19.119	806681.708	392801.869	CNRL1a
2001	0.018	22.396	806681.726	392801.874	CNRL1b
2002	0.015	23.428	806681.723	392801.881	CNRL2a
2003	0.025	25.737	806681.733	392801.869	CNRL2b
2004	0.043	26.971	806681.751	392801.880	CNRL3a
2005	0.036	28.886	806681.744	392801.877	CNRL3b
2006	0.030	30.306	806681.738	392801.870	CNRL4a
2007	0.028	32.643	806681.736	392801.842	CNRL4b
2008	0.028	33.035	806681.736	392801.855	CNRL5a
2009	0.027	35.694	806681.735	392801.869	CNRL5b
2010	0.026	36.267	806681.734	392801.884	CNRL6a
2011	0.018	39.020	806681.726	392801.750	CNRL6b
2012	0.019	39.359	806681.727	392801.879	CNRL7a
2013	0.027	41.655	806681.735	392801.886	CNRL7b
2014	0.023	42.398	806681.731	392801.889	CNRL8a
2015	0.016	44.964	806681.724	392801.894	CNRL8b
2016	0.016	45.248	806681.724	392801.904	CNRL9a
2017	0.041	47.656	806681.749	392801.896	CNRL9b
2018	0.045	48.497	806681.753	392801.911	CNRL10a
2019	0.060	50.884	806681.768	392801.903	CNRL10b
2020	0.065	51.459	806681.773	392801.907	CNRL11a
2021	0.070	53.796	806681.778	392801.895	CNRL11b
2022	0.074	54.950	806681.782	392801.891	CNRL12a
2023	0.076	57.232	806681.784	392801.882	CNRL12b

## Notes:

Coordinates in terms of New Zealand Geodetic Datum 2000 (Mt Pleasant)  
 Levels (RL's) in terms of Christchurch Drainage Datum (post 13 June 2011, earthquake), issued 4 July 2011.

Survey fixes at positions C and D, coded (a) represent bottom of panel, and (b) represent top of panel.



ESP Job No. 339164  
 Date 14/07/2011  
 Date of Survey 13/07/2011

**Coordinates and Offsets**

Warners Novotel, Cathedral Square, Christchurch.

Report prepared for Lewis Bradford Consulting Ltd

View 2 -from South to North						View 2 -from South to North					
At A						At D					
Pt No.	Offset	Elevation(m)	Northing(m)	Easting(m)	Code	Pt No.	Offset	Elevation(m)	Northing(m)	Easting(m)	Code
1640	0.000	32.882	806697.171	392769.398	lv15lhs	3000	0.000	23.319	806699.631	392801.835	CNRL2a
1641	0.002	35.942	806697.181	392769.400	lv16lhs	3001	-0.017	25.858	806699.648	392801.818	CNRL2b
1642	-0.007	38.983	806697.179	392769.391	lv17lhs	3002	-0.022	26.941	806699.653	392801.813	CNRL3a
1643	-0.006	42.043	806697.172	392769.392	lv18lhs	3003	-0.031	29.007	806699.647	392801.804	CNRL3b
1644	-0.003	45.089	806697.215	392769.395	lv19lhs	3004	-0.037	30.329	806699.656	392801.798	CNRL4a
1645	-0.007	48.123	806697.219	392769.391	lv110lhs	3005	-0.032	32.592	806699.661	392801.803	CNRL4b
1646	-0.016	51.173	806697.228	392769.382	lv111lhs	3006	-0.034	34.721	806699.661	392801.801	CNRL5a
1647	-0.002	54.223	806697.239	392769.396	lv112lhs	3007	-0.033	35.681	806699.664	392801.802	CNRL5b
building steps to the north						3008	-0.034	36.190	806699.662	392801.801	CNRL6a
						3009	-0.034	38.650	806699.663	392801.801	CNRL6b
						3010	-0.031	39.513	806699.664	392801.804	CNRL7a
						3011	-0.029	41.439	806699.664	392801.806	CNRL7b
						3012	-0.024	42.475	806699.676	392801.811	CNRL8a
						3013	-0.021	44.791	806699.677	392801.814	CNRL8b
						3014	-0.022	45.430	806699.676	392801.813	CNRL9a
						3015	-0.025	47.551	806699.676	392801.810	CNRL9b
						3016	-0.027	48.712	806699.679	392801.808	CNRL10a
						3017	-0.023	50.797	806699.683	392801.812	CNRL10b
						3018	-0.026	51.636	806699.685	392801.809	CNRL11a
						3019	-0.022	53.677	806699.685	392801.813	CNRL11b
						3020	-0.030	54.938	806699.684	392801.805	CNRL12a
						3021	-0.034	57.199	806699.685	392801.801	CNRL12b
						building steps to the north					

## View 2 -from South to North

## SW Corner

At B

Pt No.	Offset	Elevation(m)	Northing(m)	Easting(m)	Code
1630	0.000	32.904	806684.611	392769.452	L5RHS
1631	0.006	35.963	806684.615	392769.458	L6RHS
1632	-0.012	39.015	806684.605	392769.440	L7RHS
1633	-0.013	42.074	806684.620	392769.439	L8RHS
1634	-0.058	45.112	806684.602	392769.394	L9RHS
1635	-0.021	48.157	806684.597	392769.431	L10RHS
1636	0.051	51.210	806684.583	392769.503	L11RHS
1637	-0.002	54.243	806684.595	392769.450	L12RHS

## View 2 -from South to North

## SE Corner

At C

Pt No.	Offset	Elevation(m)	Northing(m)	Easting(m)	Code
2000	0.000	19.119	806681.708	392801.869	CNRL1a
2001	0.005	22.396	806681.726	392801.874	CNRL1b
2002	0.012	23.428	806681.723	392801.881	CNRL2a
2003	0.000	25.737	806681.733	392801.869	CNRL2b
2004	0.011	26.971	806681.751	392801.880	CNRL3a
2005	0.008	28.886	806681.744	392801.877	CNRL3b
2006	0.001	30.306	806681.738	392801.870	CNRL4a
2007	-0.027	32.643	806681.736	392801.842	CNRL4b
2008	-0.014	33.035	806681.736	392801.855	CNRL5a
2009	0.000	35.694	806681.735	392801.869	CNRL5b
2010	0.015	36.267	806681.734	392801.884	CNRL6a
	#N/A	#N/A			
2012	0.010	39.359	806681.727	392801.879	CNRL7a
2013	0.017	41.655	806681.735	392801.886	CNRL7b
2014	0.020	42.398	806681.731	392801.889	CNRL8a
2015	0.025	44.964	806681.724	392801.894	CNRL8b
2016	0.035	45.248	806681.724	392801.904	CNRL9a
2017	0.027	47.656	806681.749	392801.896	CNRL9b
2018	0.042	48.497	806681.753	392801.911	CNRL10a
2019	0.034	50.884	806681.768	392801.903	CNRL10b
2020	0.038	51.459	806681.773	392801.907	CNRL11a
2021	0.026	53.796	806681.778	392801.895	CNRL11b
2022	0.022	54.950	806681.782	392801.891	CNRL12a
2023	0.013	57.232	806681.784	392801.882	CNRL12b

## Notes:

Coordinates in terms of New Zealand Geodetic Datum 2000 (Mt Pleasant)  
 Levels (RL's) in terms of Christchurch Drainage Datum (post 13 June 2011, earthquake), issued 4 July 2011.

Survey fixes at positions C and D, coded (a) represent bottom of panel, and (b) represent top of panel.

2011 -0.119 39.020 806681.726 392801.750 CNRL6b  
 unreliable observation



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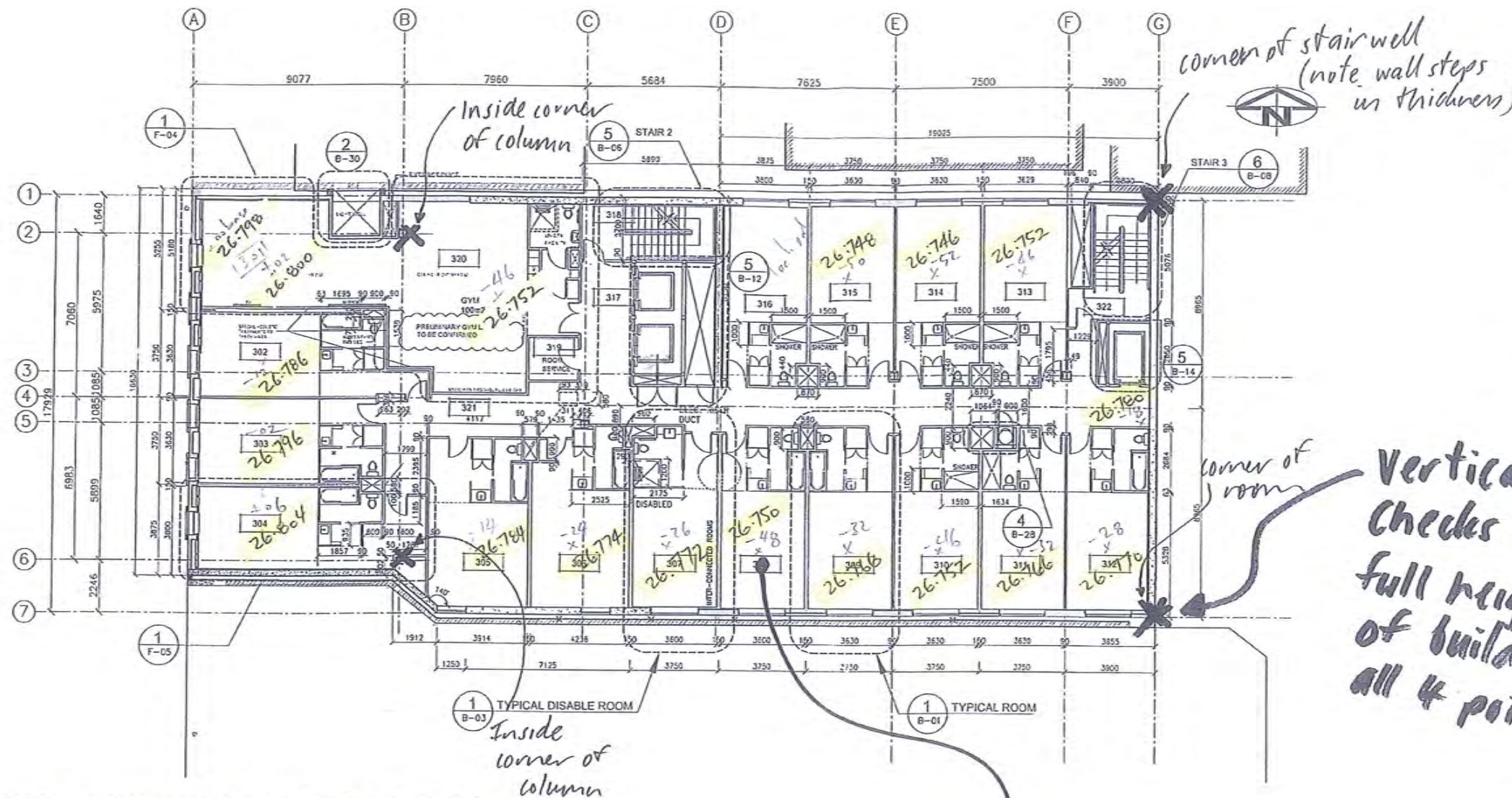
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Development et

Notes:

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### LEVEL 3 DIMENSIONING FLOOR PLAN

SCALE 1:00 @ A1  
SCALE 1:200 @ A3  
AREA = 718 m<sup>2</sup>

3-5 dB.  
on start.  
base on 1/4 step.  
remote on 1/5 start (col) = 6.084

Typical floor levels at  
say 4m c/c each way

Using zip level.

Verticality from level 5. (lowest view on tower block)

[illegible]

Job Title:

**PROPOSED WARNERS  
NOVOTEL  
CHRISTCHURCH**

Sheet Title:

**LEVEL 3 FLOOR  
DIMENSIONING PLAN**

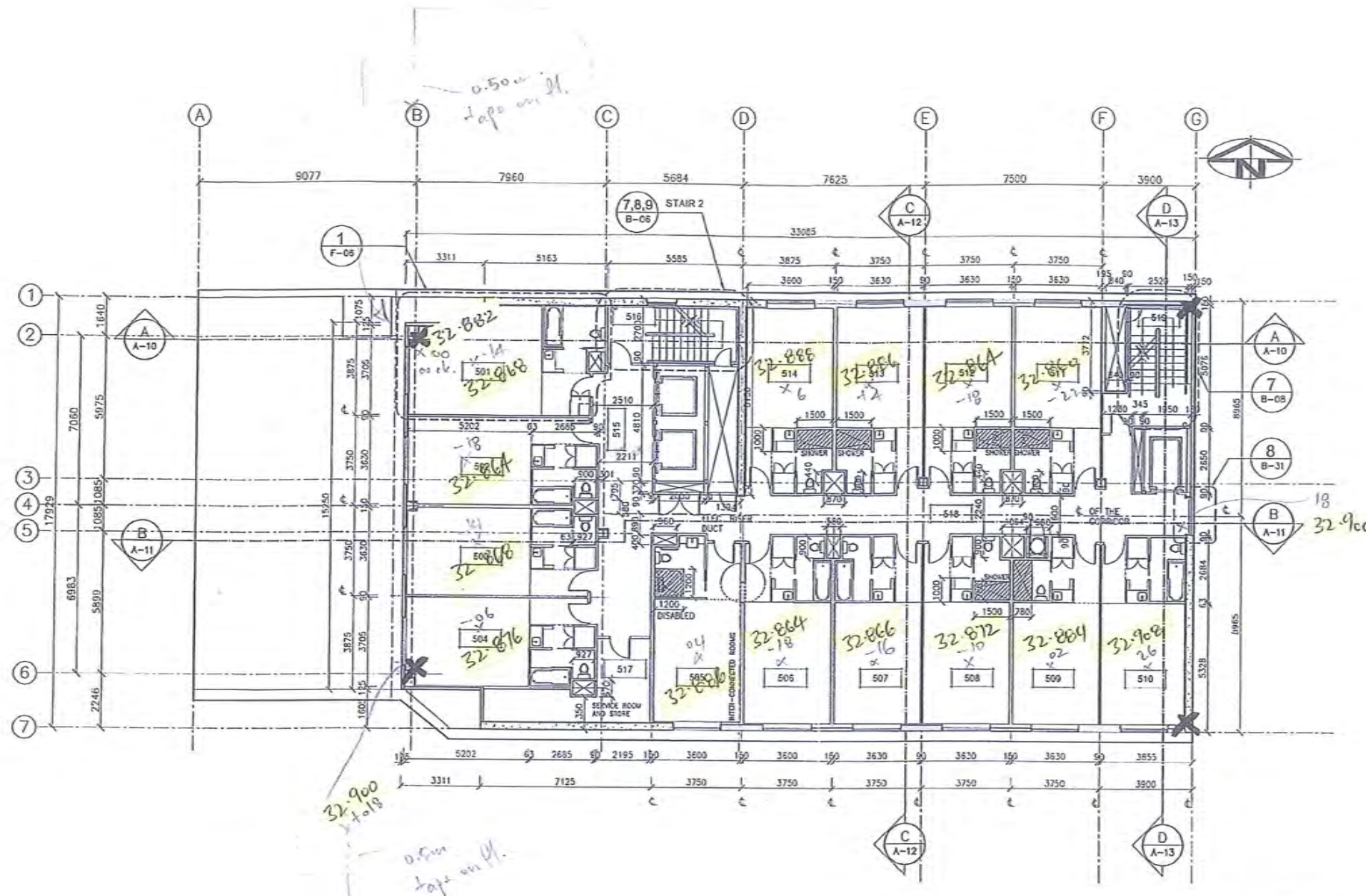
Desigred:	Date:
Drawn:	Checked:
Scale (A1 original): 1:100 (1:200@A3)	Cad File:
Project no.:	Revision <b>B</b>

50863: **A-05-D**

FOR CONSTRUCTION 26-03-2008

Group CCA Foreign Limited / CCA Australia (UK) Ltd





# TYPICAL DIMENSIONING FLOOR PLAN LEVEL 5

SCALE 1:00 @ A1  
SCALE 1:200 @ A3



25 mm MIN. SET DOWN IN THE SLAB FOR THE SHOWERS

same notes  
as per level 3

Consultant:



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Development of:

Notes:

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Rev	Date	Description	By
A	15.06.07	FOR BUILDING CONSENT	BT
B	29.01.08	PRE-CONSTRUCTION	
C	26.03.08	FOR CONSTRUCTION	

Job Title:

PROPOSED WARNERS  
NOVOTEL  
CHRISTCHURCH

Sheet Title:

FOR CONSTRUCTION 26-03-2008

## TYPICAL DIMENSIONING FLOOR PLAN

Designed:	Date:
Drawn:	Checked:
Scale (A1 original): 1:100 (1:200 @ A3)	Cad File:
Project No:	Revision C

A-06.D

Group CDA Design Limited - 22 Audubon Street



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Development of

Notes:

Figured dimensions are to be taken in preference to scaled dimensions. Verify all dimensions on the job before preparing for shop drawings or commencing work, and notify all discrepancies to Group CDA Design Limited.

[illegible]

Job Title:

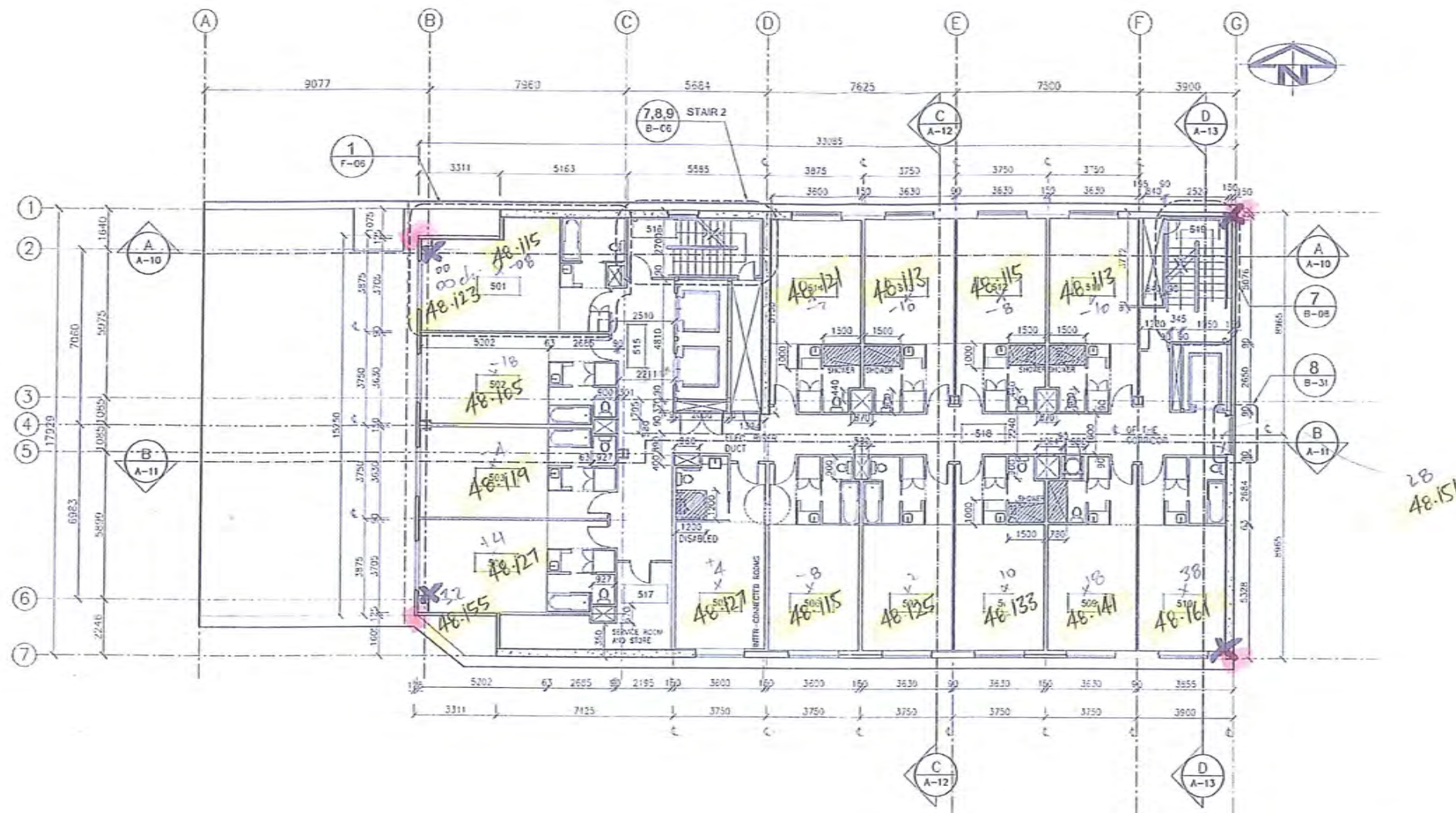
**PROPOSED WARNERS  
NOVOTEL  
CHRISTCHURCH**

Sheet Title:

**TYPICAL  
DIMENSIONING  
FLOOR PLAN**

Design:	Date:
Drawn:	Checked:
Scale (At original): 1:100 (1:200 @ A3)	Cad File:
Project No.:	Revision: <b>C</b>

A-06.D



**TYPICAL DIMENSIONING FLOOR PLAN**      **LEVEL 10**

SCALE 1:00 @ A1  
SCALE 1:200 @ A3



25 mm MIN. SET DOWN IN THE SLAB FOR THE SHOWERS

Same notes  
as per level 3

FOR CONSTRUCTION 26-03-2008

**LBA - Ash**

---

**From:** Chris Walker <Chris.Walker@eliotsinclair.co.nz>  
**Sent:** Monday, 8 August 2011 1:51 p.m.  
**To:** ashleyw@lewisbradford.com  
**Cc:** Warren Haynes  
**Subject:** [# - 339164] Warners Novotel pre and post EQ Level Change.

Ash,

Further to your phone call this afternoon, and comparing the RL of our site BM origin(MA 9000, west cnr of Colombo St Nth and Cathedral Sq), we calculate the following difference;

year 2007 level, 14.468m , Christchurch Drainage Datum (CDD)  
year 2011 July level, 14.335m, new CDD post 13 June 2011 EQ.

difference 0.133m

Regards

*Chris Walker* (BSurv)  
Registered Professional Surveyor  
Licenced Cadastral Surveyor

[chris.walker@eliotsinclair.co.nz](mailto:chris.walker@eliotsinclair.co.nz)

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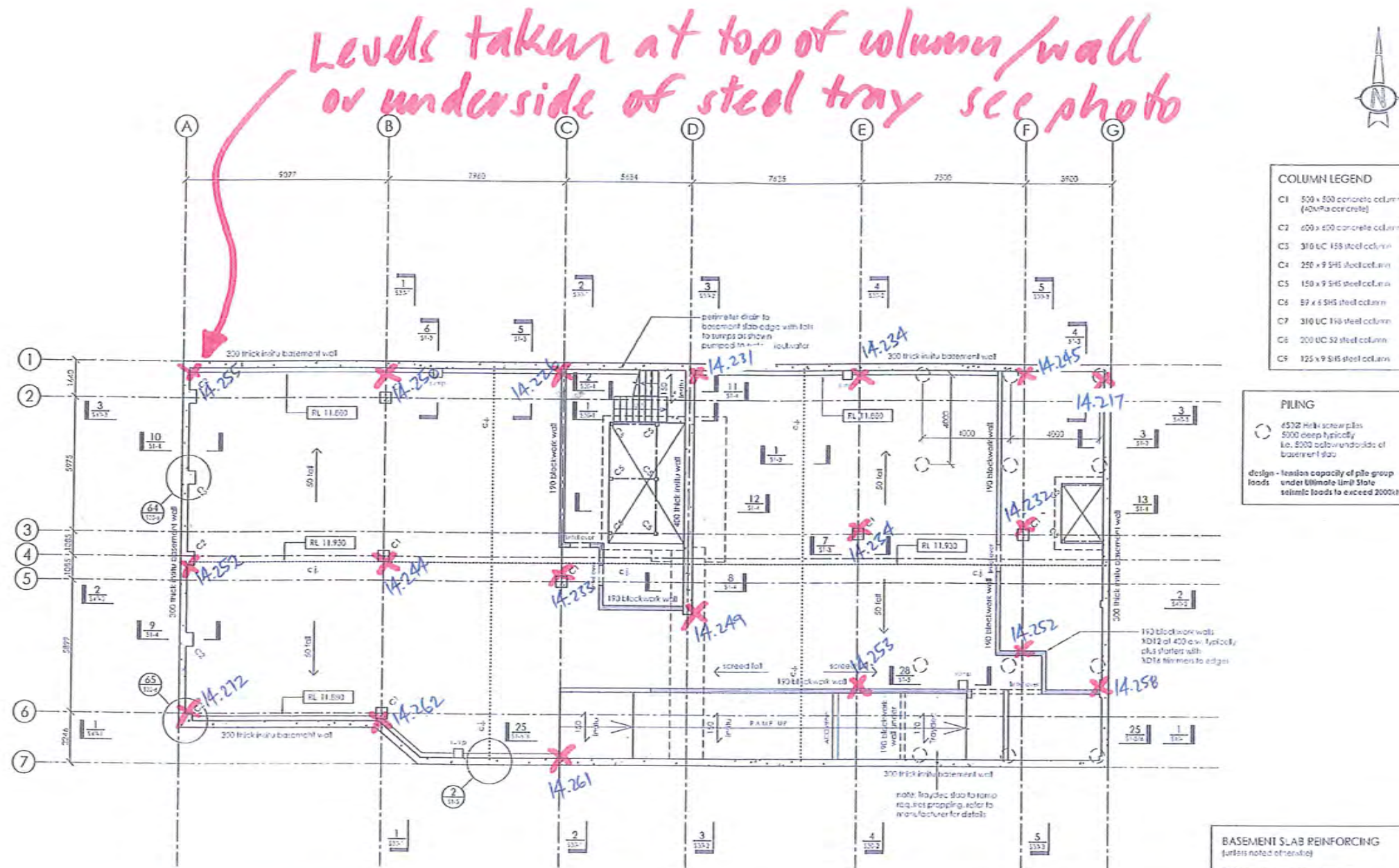
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CONTRACTOR TO VERIFY ALL DIMENSIONS ON SITE PRIOR TO ANY CONSTRUCTION WORK.

**NOTES:**

Refer notes at start of drawing set for notes typically.

Refer Architect drawings for all set out dimensions, opening sizes, duct set outs, rebates, inductions, upstands, sash parts etc.

All discrepancies in work to be referred to the Architect for resolution before proceeding with work.

Refer hydraulic drawings for pipe penetrations required through foundations.

Foundation material shall be approved by the Engineer for safe loading capacity before construction of any footings.

Slab construction joints, as shown, D.C. and agree set out of construction joints well in advance of construction with the Engineer. Refer Specification.

Typically, all in situ concrete wall elements to be 30 MPa concrete unless noted otherwise.

Typically, all precast concrete and precast beams to be 35 MPa concrete unless noted otherwise.

All initial interfaces and construction joints shall be thoroughly roughened to 5mm amplitude.

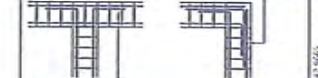
All precast to initial interfaces and grouted joints shall be thoroughly roughened to 5mm amplitude.

Confirm all dimensions with all manufacturers before commencing construction. Also confirm location of all pile survey.

All primary load bearing steelwork (including columns, beams, etc.) will require specific fire rating. Refer to fire Engineer and/or Architect for requirements, details and fire rating options.

Refer Specification for waterproofing details to basement slab and walls including protection and guarantee requirements.

All horizontal foundation reinforcing must lap adequately at corners and junctions as indicated below.



Refer ends, 24 x bar diameter

REV.	DATE	AMENDMENT	BY
A	22/01/08	CONSTRUCTION ISSUE	GPW
5	31/05/07	CONSENT ISSUE	GPW
4	22/03/07	TENDER UPDATE ISSUE	GPW
3	26/02/07	TENDER UPDATE	GPW
2	31/01/07	TENDER ISSUE	GPW
1	21/12/06	FOR CLIENT REVIEW	GPW

ARCHITECT:

**lewis bradford**  
CONSULTING ENGINEERS

PROJECT:  
**WARNERS NOVOTEL  
CHRISTCHURCH**

DRAWING TITLE:  
**BASEMENT FLOOR PLAN  
(UPPER)**

DRAWN: GPW	SCALE: 1:100 @ A1
ENGINEER: AJW	1:200 @ A3
CHECKED: CBL	
FILE: 106019	DRAWING NO. S1-2
	REV. A

Drawn and Checked: GPW, AJW, CBL, S1-2, S1-3, S1-4, S1-5, S1-6, S1-7, S1-8, S1-9, S1-10, S1-11, S1-12, S1-13, S1-14, S1-15, S1-16, S1-17, S1-18, S1-19, S1-20, S1-21, S1-22, S1-23, S1-24, S1-25, S1-26, S1-27, S1-28, S1-29, S1-30, S1-31, S1-32, S1-33, S1-34, S1-35, S1-36, S1-37, S1-38, S1-39, S1-40, S1-41, S1-42, S1-43, S1-44, S1-45, S1-46, S1-47, S1-48, S1-49, S1-50, S1-51, S1-52, S1-53, S1-54, S1-55, S1-56, S1-57, S1-58, S1-59, S1-60, S1-61, S1-62, S1-63, S1-64, S1-65, S1-66, S1-67, S1-68, S1-69, S1-70, S1-71, S1-72, S1-73, S1-74, S1-75, S1-76, S1-77, S1-78, S1-79, S1-80, S1-81, S1-82, S1-83, S1-84, S1-85, S1-86, S1-87, S1-88, S1-89, S1-90, S1-91, S1-92, S1-93, S1-94, S1-95, S1-96, S1-97, S1-98, S1-99, S1-100, S1-101, S1-102, S1-103, S1-104, S1-105, S1-106, S1-107, S1-108, S1-109, S1-110, S1-111, S1-112, S1-113, S1-114, S1-115, S1-116, S1-117, S1-118, S1-119, S1-120, S1-121, S1-122, S1-123, S1-124, S1-125, S1-126, S1-127, S1-128, S1-129, S1-130, S1-131, S1-132, S1-133, S1-134, S1-135, 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S1-636, S1-637, S1-638, S1-639, S1-640, S1-641, S1-642, S1-643, S1-644, S1-645, S1-646, S1-647, S1-648, S1-649, S1-650, S1-651, S1-652, S1-653, S1-654, S1-655, S1-656, S1-657, S1-658, S1-659, S1-660, S1-661, S1-662, S1-663, S1-664, S1-665, S1-666, S1-667, S1-668, S1-669, S1-670, S1-671, S1-672, S1-673, S1-674, S1-675, S1-676, S1-677, S1-678, S1-679, S1-680, S1-681, S1-682, S1-683, S1-684, S1-685, S1-686, S1-687, S1-688, S1-689, S1-690, S1-691, S1-692, S1-693, S1-694, S1-695, S1-696, S1-697, S1-698, S1-699, S1-700, S1-701, S1-702, S1-703, S1-704, S1-705, S1-706, S1-707, S1-708, S1-709, S1-710, S1-711, S1-712, S1-713, S1-714, S1-715, S1-716, S1-717, S1-718, S1-719, S1-720, S1-721, S1-722, S1-723, S1-724, S1-725, S1-726, S1-727, S1-728, S1-729, S1-730, S1-731, S1-732, S1-733, S1-734, S1-735, S1-736, S1-737, S1-738, S1-739, S1-740, S1-741, S1-742, S1-743, S1-744, S1-745, S1-746, S1-747, S1-748, S1-749, S1-750, S1-751, S1-752, S1-753, S1-754, S1-755, S1-756, S1-757, S1-758, S1-759, S1-760, S1-761, S1-762, S1-763, S1-764, S1-765, S1-766, S1-767, S1-768, S1-769, S1-770, S1-771, S1-772, S1-773, S1-774, S1-775, S1-776, S1-777, S1-778, S1-779, S1-780, S1-781, S1-782, S1-783, S1-784, S1-785, S1-786, S1-787, S1-788, S1-789, S1-790, S1-791, S1-792, S1-793, S1-794, S1-795, S1-796, S1-797, S1-798, S1-799, S1-800, S1-801, S1-802, S1-803, S1-804, S1-805, S1-806, S1-807, S1-808, S1-809, S1-810, S1-811, S1-812, S1-813, S1-814, S1-815, S1-816, S1-817, S1-818, S1-819, S1-820, S1-821, S1-822, S1-823, S1-824, S1-825, S1-826, S1-827, S1-828, S1-829, S1-830, S1-831, S1-832, S1-833, S1-834, S1-835, S1-836, S1-837, S1-838, S1-839, S1-840, S1-841, S1-842, S1-843, S1-844, S1-845, S1-846, S1-847, S1-848, S1-849, S1-850, S1-851, S1-852, S1-853, S1-854, S1-855, S1-856, S1-857, S1-858, S1-859, S1-860, S1-861, S1-862, S1-863, S1-864, S1-865, S1-866, S1-867, S1-868, S1-869, S1-870, S1-871, S1-872, S1-873, S1-874, S1-875, S1-876, S1-877, S1-878, S1-879, S1-880, S1-881, S1-882, S1-883, S1-884, S1-885, S1-886, S1-887, S1-888, S1-889, S1-890, S1-891, S1-892, S1-893, S1-894, S1-895, S1-896, S1-897, S1-898, S1-899, S1-900, S1-901, S1-902, S1-903, S1-904, S1-905, S1-906, S1-907, S1-908, S1-909, S1-910, S1-911, S1-912, S1-913, S1-914, S1-915, S1-916, S1-917, S1-918, S1-919, S1-920, S1-921, S1-922, S1-923, S1-924, S1-925, S1-926, S1-927, S1-928, S1-929, S1-930, S1-931, S1-932, S1-933, S1-934, S1-935, S1-936, S1-937, S1-938, S1-939, S1-940, S1-941, S1-942, S1-943, S1-944, S1-945, S1-946, S1-947, S1-948, S1-949, S1-950, S1-951, S1-952, S1-953, S1-954, S1-955, S1-956, S1-957, S1-958, S1-959, S1-960, S1-961, S1-962, S1-963, S1-964, S1-965, S1-966, S1-967, S1-968, S1-969, S1-970, S1-971, S1-972, S1-973, S1-974, S1-975, S1-976, S1-977, S1-978, S1-979, S1-980, S1-981, S1-982, S1-983, S1-984, S1-985, S1-986, S1-987, S1-988, S1-989, S1-990, S1-991, S1-992, S1-993, S1-994, S1-995, S1-996, S1-997, S1-998, S1-999, S1-1000, S1-1001, S1-1002, S1-1003, S1-1004, S1-1005, S1-1006, S1-1007, S1-1008, S1-1009, S1-1010, S1-1011, S1-1012, S1-1013, S1-1014, S1-1015, S1-1016, S1-1017, S1-1018, S1-1019, S1-1020, S1-1021, S1-1022, S1-1023, S1-1024, S1-1025, S1-1026, S1-1027, S1-1028, S1-1029, S1-1030, S1-1031, S1-1032, S1-1033, S1-1034, S1-1035, S1-1036, S1-1037, S1-1038, S1-1039, S1-1040, S1-1041, S1-1042, S1-1043, S1-1044, S1-1045, S1-1046, S1-1047, S1-1048, S1-1049, S1-1050, S1-1051, S1-1052, S1-1053, S1-1054, S1-1055, S1-1056, S1-1057, S1-1058, S1-1059, S1-1060, S1-1061, S1-1062, S1-1063, S1-1064, S1-1065, S1-1066, S1-1067, S1-1068, S1-1069, S1-1070, S1-1071, S1-1072, S1-1073, S1-1074, S1-1075, S1-1076, S1-1077, S1-1078, S1-1079, S1-1080, S1-1081, S1-1082, S1-1083, S1-1084, S1-1085, S1-1086, S1-1087, S1-1088, S1-1089, S1-1090, S1-1091, S1-1092, S1-1093, S1-1094, S1-1095, S1-1096, S1-1097, S1-1098, S1-1099, S1-1100, S1-1101, S1-1102, S1-1103, S1-1104, S1-1105, S1-1106, S1-1107, S1-1108, S1-1109, S1-1110, S1-1111, S1-1112, S1-1113, S1-1114, S1-1115, S1-1116, S1-1117, S1-1118, S1-1119, S1-1120, S1-1121, S1-1122, S1-1123, S1-1124, S1-1125, S1-1126, S1-1127, S1-1128, S1-1129, S1-1130, S1-1131, S1-1132, S1-1133, S1-1134, S1-1135, S1-1136, S1-1137, S1-1138, S1-1139, S1-1140, S1-1141, S1-1142, S1-1143, S1-1144, S1-1145, S1-1146, S1-1147, S1-1148, S1-1149, S1-1150, S1-1151, S1-1152, S1-1153, S1-1154, S1-1155, S1-1156, S1-1157, S1-1158, S1-1159, S1-1160, S1-1161, S1-1162, S1-1163, S1-1164, S1-1165, S1-1166, S1-1167, S1-1168, S1-1169, S1-1170, S1-1171, S1-1172, S1-1173, S1-1174, S1-1175, S1-1176, S1-1177, S1-1178, S1-1179, S1-1180, S1-1181, S1-1182, S1-1183, S1-1184, S1-1185, S1-1186, S1-1187, S1-1188, S1-1189, S1-1190, S1-1191, S1-1192, S1-1193, S1-1194, S1-1195, S1-1196, S1-1197, S1-1198, S1-1199, S1-1200, S1-1201, S1-1202, S1-1203, S1-1204, S1-1205, S1-1206, S1-1207, S1-1208, S1-1209, S1-1210, S1-1211, S1-1212, S1-1213, S1-1214, S1-1215, S1-1216, S1-1217, S1-1218, S1-1219, S1-1220, S1-1221, S1-1222, S1-1223, S1-1224, S1-1225, S1-1226, S1-1227, S1-1228, S1-1229, S1-1230, S1-1231, S1-1232, S1-1233, S1-1234, S1-1235, S1-1236, S1-1237, S1-1238, S1-1239, S1-1240, S1-1241, S1-1242, S1-1243, S1-1244, S1-1245, S1-1246, S1-1247, S1-1248, S1-1249, S1-1250, S1-1251, S1-1252, S1-1253, S1-1254, S1-1255, S1-1256, S1-1257, S1-1258, S1-1259, S1-1260, S1-1261, S1-1262, S1-1263, S1-1264, S1-1265, S1-1266, S1-1267, S1-1268, S1-1269, S1-1270, S1-1271, S1-1272, S1-1273, S1-1274, S1-1275, S1-1276, S1-1277, S1-1278, S1-1279, S1-1280, S1-1281, S1-1282, S1-1283, S1-1284, S1-1285, S1-1286, S1-1287, S1-1288, S1-1289, S1-1290, S1-1291, S1-1292, S1-1293, S1-1294, S1-1295, S1-1296, S1-1297, S1-1298, S1-1299, S1-1300, S1-1301, S1-1302, S1-1303, S1-1304, S1-1305, S1-1306, S1-1307, S1-1308, S1-1309, S1-1310, S1-1311, S1-1312, S1-1313, S1-1314, S1-1315, S1-1316, S1-1317, S1-1318, S1-1319, S1-1320, S1-1321, S1-1322, S1-1323, S1-1324, S1-1325, S1-1326, S1-1327, S1-1328, S1-1329, S1-1330, S1-1331, S1-1332, S1-1333, S1-1334, S1-1335, S1-1336, S1-1337, S1-1338, S1-1339, S1-1340, S1-1341, S1-1342, S1-1343, S1-1344, S1-1345, S1-1346, S1-1347, S1-1348, S1-1349, S1-1350, S1-1351, S1-1352, S1-1353, S1-1354, S1-1355, S1-1356, S1-1357, S1-1358, S1-1359, S1-1360, S1-1361, S1-1362, S1-1363, S1-1364, S1-1365, S1-1366, S1-1367, S1-1368, S1-1369, S1-1370, S

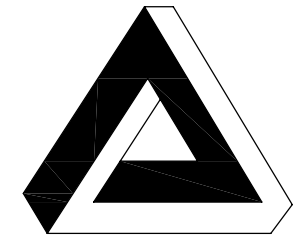


STRUCTURAL DRAWINGS - Construction Issue 22 January 2008

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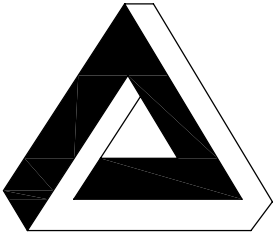


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## Structural Drawing Index - Construction Issue 22 January 2008

S0-1	Siteworks/Temporary Excavation Support Plan	S20-1	General Arrangement Precast Panel/Wall Elevations Gridlines 1 & 2
S1-1	Basement Plan (Lower)	S20-2	General Arrangement Precast Panel/Wall Elevations Gridline G
S1-2	Basement Plan (Upper)	S20-3	General Arrangement Precast Panel/Wall Elevations Gridlines 7 & 6
S1-3	Basement Details Sheet 1 of 4	S20-4	General Arrangement Precast Panel/Wall Elevations Gridlines B & D
S1-4	Basement Details Sheet 2 of 4		
S1-5	Basement Details Sheet 3 of 4	S20-10	Precast Panel Elevation near Gridline 2
S1-6	Basement Details Sheet 4 of 4	S20-11	Precast Panel/Wall Elevation Gridline 1 Sheet 1 of 4
		S20-12	Precast Panel/Wall Elevation Gridline 1 Sheet 2 of 4
S2-1	Ground Floor Plan	S20-13	Precast Panel/Wall Elevation Gridline 1 Sheet 3 of 4
S2-2	Ground Floor Details Sheet 1 of 4	S20-14	Precast Panel/Wall Elevation Gridline 1 Sheet 4 of 4
S2-3	Ground Floor Details Sheet 2 of 4	S20-15	Precast Panel/Wall Elevation Gridline G Sheet 1 of 3
S2-4	Ground Floor Details Sheet 3 of 4	S20-16	Precast Panel/Wall Elevation Gridline G Sheet 2 of 3
S2-5	Ground Floor Details Sheet 4 of 4	S20-17	Precast Panel/Wall Elevation Gridline G Sheet 3 of 3
		S20-18	Precast Panel/Wall Elevation Gridline 7 Sheet 1 of 3
S3-1	Level 1 Plan	S20-19	Precast Panel/Wall Elevation Gridline 7 Sheet 2 of 3
S3-2	Level 1 Details Sheet 1 of 2	S20-20	Precast Panel/Wall Elevation Gridline 7 Sheet 3 of 3
S3-3	Level 1 Details Sheet 2 of 2	S20-21	Precast Panel/Wall Elevation Gridline 6 Sheet 1 of 2
		S20-22	Precast Panel/Wall Elevation Gridline 6 Sheet 2 of 2
S4-1	Level 2 Plan	S20-23	Precast Panel Elevation Gridline B Sheet 1 of 2
S4-2	Level 2 Details Sheet 1 of 2	S20-24	Precast Panel Elevation Gridline B Sheet 2 of 2
S4-3	Level 2 Details Sheet 2 of 2	S20-25	Precast Panel/Wall Elevation Gridline D Sheet 1 of 2
		S20-26	Precast Panel/Wall Elevation Gridline D Sheet 2 of 2
S5-1	Level 3 Plan	S20-27	Precast Panel/Wall Elevation Gridline A
S5-2	Level 3 Details Sheet 1 of 3	S20-28	Precast Panel Elevation Level 13
S5-3	Level 3 Details Sheet 2 of 3		
S5-4	Level 3 Details Sheet 3 of 3	S21-1	125 Precast Panel Typical Elevations and Details
S6-1	Level 4 Plan	S22-1	Precast Panel/Wall Typical Details Sheet 1 of 6
S6-2	Level 4 Details Sheet 1 of 3	S22-2	Precast Panel/Wall Typical Details Sheet 2 of 6
S6-3	Level 4 Details Sheet 2 of 3	S22-3	Precast Panel/Wall Typical Details Sheet 3 of 6
S6-4	Level 4 Details Sheet 3 of 3	S22-4	Precast Panel/Wall Typical Details Sheet 4 of 6
		S22-5	Precast Panel/Wall Typical Details Sheet 5 of 6
S7-1	Level 5 Plan	S22-6	Precast Panel/Wall Typical Details Sheet 6 of 6
S7-2	Level 5 Details Sheet 1 of 2		
S7-3	Level 5 Details Sheet 2 of 2	S22-10	Deleted
S8-1	Level 6 Plan	S30-1	Frame Elevations Gridlines B & C
S8-2	Level 6 Details Sheet 1 of 2	S30-2	Frame Elevations Gridlines D & E
S8-3	Level 6 Details Sheet 2 of 2	S30-3	Frame Elevations Gridline F & Typical C1 Column Details
S9-1	Level 7 Plan	S31-1	Typical Steelwork/Frame Details Sheet 1 of 8
S9-2	Level 7 Details Sheet 1 of 1	S31-2	Typical Steelwork/Frame Details Sheet 2 of 8
		S31-3	Typical Steelwork/Frame Details Sheet 3 of 8
S10-1	Level 8 Plan	S31-4	Typical Steelwork/Frame Details Sheet 4 of 8
S10-2	Level 8 Details Sheet 1 of 1	S31-5	Typical Steelwork/Frame Details Sheet 5 of 8
		S31-6	Typical Steelwork/Frame Details Sheet 6 of 8
S11-1	Level 9 Plan	S31-7	Typical Steelwork/Frame Details Sheet 7 of 8
S11-2	Level 9-12 Details Sheet 1 of 1	S31-8	Typical Steelwork/Frame Details Sheet 8 of 8
S12-1	Level 10 Plan	S32-1	Typical Lift Shaft Steelwork Details Sheet 1 of 1
S13-1	Level 11 & 12 Plan	S40-1	General Long Section Gridline 6
		S40-2	Generic Long Section Gridlines 3, 4 & 5
S14-1	Level 13 Plan	S40-3	General Long Section Gridline 2
S14-2	Level 13 Details Sheet 1 of 2		
S14-3	Level 13 Details Sheet 2 of 2	S50-1	Northern Stairs Elevations and Details Sheet 1 of 2
		S50-2	Northern Stairs Elevations and Details Sheet 2 of 2
S15-1	Plant Room Plan		
		S51-1	Eastern Stairs Elevations and Details Sheet 1 of 4
S16-1	Roof Plan	S51-2	Eastern Stairs Elevations and Details Sheet 2 of 4
		S51-3	Eastern Stairs Elevations and Details Sheet 3 of 4
		S51-4	Eastern Stairs Elevations and Details Sheet 4 of 4
		S52-1	Lobby Stairs Elevations and Details Sheet 1 of 1
		S60-1	Weldplate Details Sheet 1 of 2
		S60-2	Weldplate Details Sheet 2 of 2





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# STANDARD NOTES

GENERAL NOTES :

Refer Architects drawings for all set out dimensions, opening sizes, slab set downs, rebates, insitu nibs, upstands, sealants etc.

All discrepancies shall be referred to the Architect for resolution before proceeding with work.

Refer hydraulic drawings for pipe penetrations required through foundations.

Foundation material shall be approved by the Engineer for safe bearing capacity before construction of any footings.

Slab construction joints as shown. Discuss and agree set out of construction joints well in advance of construction with Site Engineer. Refer Specification

All insitu interfaces and construction joints shall be thoroughly roughened to 5mm amplitude.

All precast to insitu interfaces and grouted joints shall be thoroughly roughened to 5mm amplitude.

All insitu walls to have XD starters  
All precast panels to have D starters  
All starters shall lap for full lap length beyond outermost drag bar where applicable

Floor topping bars running parallel to numerical gridlines shall have 30mm top cover (i.e. top bars - refer details)

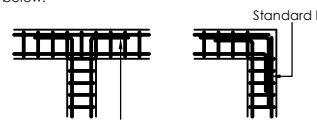
Confirm all lift dimensions with lift manufacturers before commencing construction. Also confirm location of lift pit sumps.

All primary load bearing steelwork (including columns, beams, etc.) will require specific fire rating. Refer to Fire Engineer and/or Architect for requirements, details, and fire rating options.

Refer Specification for waterproofing details to basement slab and walls including protection and guarantee requirements.

All slab openings shall be trimmed with XD16 bars to all edges extend 600mm past opening u.n.o.

All horizontal foundation reinforcing must lap adequately at corners and junctions as indicated below.



Return ends 24 x bar diameter

STEELWORK NOTES :

All structural steel shall be mild steel conforming to NZS 3404:1997.

Refer Architect's drawings for details of drilled hole requirements to suit timber plate fixings to steel work members unless detailed otherwise.

Surface preparation and corrosion protection of steel work shall be in accordance with the Specification.

All exposed ends of RHS members to be capped with ex. 10mm ms plate unless shown otherwise.

All plates shall be 10mm minimum unless noted otherwise.

Unless shown otherwise, all welds are to be 6 fillet weld all round refer to the Specification for type and class of weld.

Mild steel flat anchors to weldplates to have minimum bend radius of 2.5 x thickness of flat and bent around a former pin.

All bolts and nuts shall be grade 8.8 high strength.

All holding down bolts and other fixing devices, shall have a minimum yield stress of 240 MPa unless noted otherwise.

Provide 200 nom. Nelson shear studs 100 long to all steel beams u.n.o.  
welded in accordance with AS 1554 Part 2.  
at 150 centres for all primary UC beams  
at 200 centres for all secondary UB beams

All exterior steel work to be hot dip galvanised in accordance with AS 1650, unless noted otherwise.

All dry pack mortar/grout shall have a compressive strength of at least 40 MPa.

The Contractor shall provide two copies of the shop drawings for the structural steel work to the Engineer for approval, 14 days prior to manufacture.

PRECAST NOTES :

Refer Architects drawings for all set out dimensions, opening sizes, slab set downs, rebates etc. Should there be any discrepancies between the architectural and engineering plans advise the engineer.

Confirm all lift dimensions with lift manufacturers before commencing construction. Also confirm location of lift pit sumps.

Construction joints, where not shown on drawings, shall be located to the approval of the Engineer.

No penetrations, chases or embedments of pipes, other than those shown on the structural drawings shall be made in concrete members without the prior approval of the Engineer.

Typically all insitu concrete wall elements to be 30 MPa concrete unless noted otherwise.

Typically all precast concrete and precast beams to be 35 MPa concrete unless noted otherwise.

Unless shown otherwise all horizontal and vertical precast panel joints to be 15mm.

All insitu interfaces and construction joints shall be thoroughly roughened to 5mm amplitude.

All precast to insitu interfaces and grouted joints shall be thoroughly roughened to 5mm amplitude.

125mm thick precast panels

Typical panel reinforcing:  
XD12 at 300 e.w. central and XD10 links at 300 to all precast lintel elements with XD16 trimmers to all edges and openings unless noted otherwise.  
D12 floor starters at 300 to all floor levels.  
D1 Drossbach ducts to panels for XD12 starters from precast panel/insitu joint/flooring below.  
Allow to cast ducts for external sprinklers - refer Fire Engineer for details.

The lifting and transporting etc. of all panels is the responsibility of the Contractor, this includes the provision of strong backs as required (refer Specification).

The Contractor shall provide two copies of the shop drawings for precast concrete work to the Engineer for approval 14 days prior to manufacture.

All precast beams to be propped during construction.

Unless noted otherwise provide 35 mm cover to horizontal bars (i.e. outer bars).

Typically horizontal bars in double reinforced panels are to be outside vertical reinforcing 35mm cover to outside bars typical



REINFORCING BAR LAPS		
Bar size	Lap length concrete	Lap length concrete block
D12	500 mm	500 mm
D16	650 mm	650 mm
D20	800 mm	800 mm
D25	1000 mm	1000 mm
D32	1300 mm	1300 mm
XD12	700 mm	850 mm
XD16	800 mm	1100 mm
XD20	1000 mm	1400 mm
XD25	1250 mm	1750 mm
XD32	1600 mm	2250 mm

BLOCKWORK NOTES :

Concrete masonry blocks shall have a compressive strength of 20 MPa, density 1750 kg/m3 and conform to NZS 3102, unless noted otherwise.

Mortar shall comply with the requirements of NZS 4210, with compressive strength not less than 20 MPa.

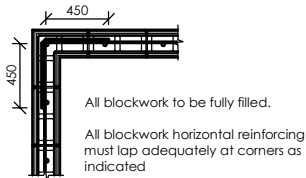
All cores shall be grout filled (20 MPa) unless noted otherwise on the drawings.

In general, walls to be full height before grouting cores. Cleanout openings to be provided in the bottom course (1200mm crs. maximum). Before placing vertical reinforcement, cores are to be cleaned of all blockwork fins and droppings through cleanout openings which are not to be closed until inspected by the Engineer. Grout to be rodded to ensure filling of cores with a maximum continuous pour height of 3600mm.

Control joints should be provided at 8000mm maximum crs. Where not shown on the drawings, the joints should be located to the approval of the Engineer.

Where masonry is to be constructed on suspended concrete without a corresponding wall under, the concrete must be fully depropped before commencement of this masonry.

Cutting chases in loadbearing masonry units is not permitted without prior approval of the Engineer.



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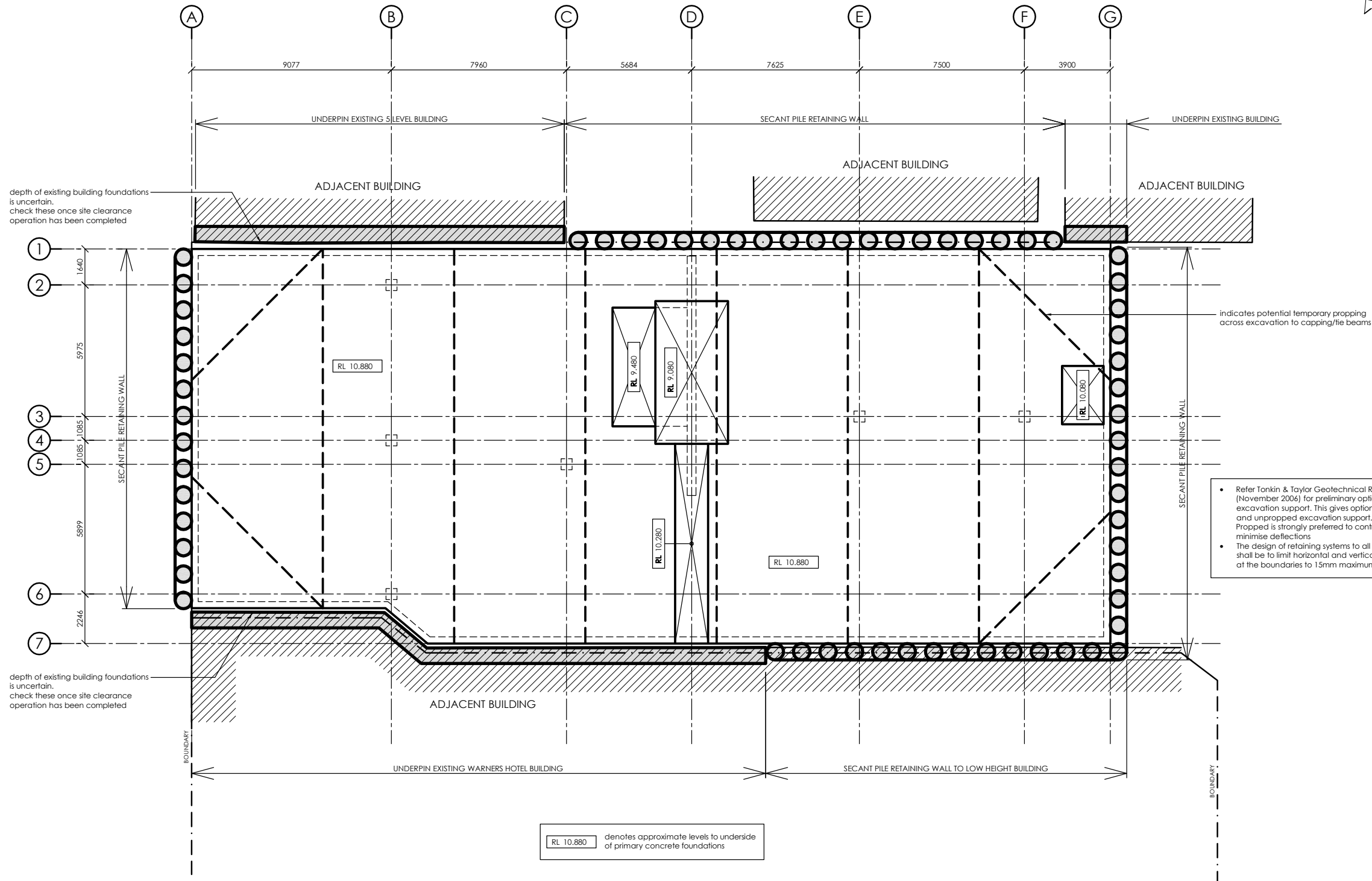
CONTRACTOR TO VERIFY ALL DIMENSIONS ON SITE  
REFER TO ARCHITECT'S DRAWING FOR ALL SETOUTS

NOTES :

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Refer Architects drawings for all set out dimensions, opening sizes, slab set downs, rebates, insitu nibs, upstands, sealants etc.

All discrepancies shall be referred to the Architect for resolution before proceeding with work.



SITEWORKS/TEMPORARY EXCAVATION SUPPORT PLAN  
1:100

UNDERPINNING AND SECANT PILE RETAINING SYSTEMS  
ARE CRITICAL OPERATIONS. REFER SPECIFICATION FOR  
REQUIREMENTS OF THESE AND DEWATERING OPERATIONS

NOTE: UNDERPINNING AND RETAINING  
SYSTEMS SHOWN ARE INDICATIVE ONLY.  
SUBJECT TO SPECIFIC DESIGN/BUILD  
AND CONSENT BY MAIN CONTRACTOR

REV.	DATE	AMENDMENT	BY
A	22/01/08	CONSTRUCTION ISSUE	GPW
3	31/05/07	CONSENT ISSUE	GPW
2	31/01/07	TENDER ISSUE	GPW
1	21/12/06	FOR CLIENT REVIEW	GPW

ARCHITECT:



lewis bradford  
CONSULTING ENGINEERS

PROJECT:

WARNERS NOVOTEL  
CHRISTCHURCH

DRAWING TITLE:

SITEWORKS/TEMPORARY  
EXCAVATION SUPPORT PLAN

DRAWN:	GPW	SCALE:	1:100 @ A1
ENGINEER:	AJW		1:200 @ A3
CHECKED:	CBL		
FILE:	106019	DRAWING NO.	S0-1
		REV.	A

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All discrepancies shall be referred to the Architect for resolution before proceeding with work.

Refer hydraulic drawings for pipe penetrations required through foundations.

Foundation material shall be approved by the Engineer for safe bearing capacity before construction of any footings.

Slab construction joints as shown. Discuss and agree set out of construction joints well in advance of construction with Site Engineer. Refer Specification

Typically all insitu concrete wall elements to be 30 MPa concrete unless noted otherwise.

Typically all precast concrete and precast beams to be 35 MPa concrete unless noted otherwise.

All insitu interfaces and construction joints shall be thoroughly roughened to 5mm amplitude.

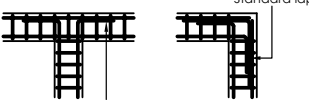
All precast to insitu interfaces and grouted joints shall be thoroughly roughened to 5mm amplitude.

Confirm all lift dimensions with lift manufacturers before commencing construction. Also confirm location of lift pit sumps.

All primary load bearing steelwork (including columns, beams, etc.) will require specific fire rating. Refer to Fire Engineer and/or Architect for requirements, details, and fire rating options.

Refer Specification for waterproofing details to basement slab and walls including protection and guarantee requirements.

All horizontal foundation reinforcing must lap adequately at corners and junctions as indicated below.



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1	31/05/07	CONSENT ISSUE	GPW
REV.	DATE	AMENDMENT	BY

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PROJECT:

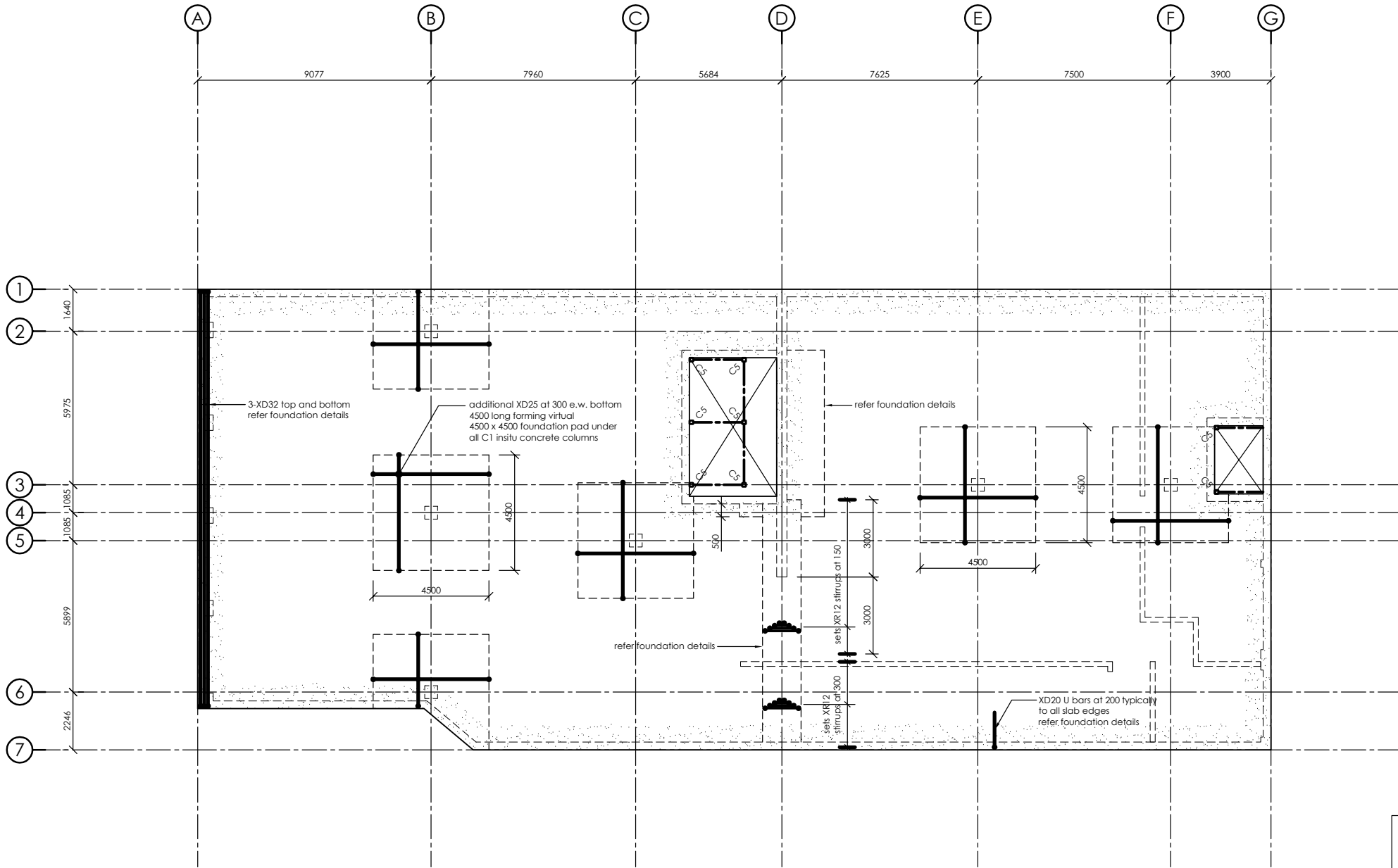
WARNERS NOVOTEL  
CHRISTCHURCH

DRAWING TITLE:

BASEMENT FLOOR PLAN  
(LOWER)

DRAWN: GPW	SCALE: 1:100 @ A1 1:200 @ A3	
ENGINEER: AJW		
CHECKED: CBL		
FILE: 106019	DRAWING NO. S1-1	REV. A

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COLUMN LEGEND

- C1 500 x 500 concrete column (40MPa concrete)
- C2 600 x 600 concrete column
- C3 310 UC 158 steel column
- C4 250 x 9 SHS steel column
- C5 150 x 9 SHS steel column
- C6 89 x 6 SHS steel column
- C7 310 UC 198 steel column
- C8 200 UC 52 steel column
- C9 125 x 9 SHS steel column
- C10 100 x 9 SHS steel column

BASEMENT SLAB REINFORCING  
(unless noted otherwise)

1000 thick insitu basement raft slab on DPC on 50mm site concrete  
XD25 at 200 e.w., top 60mm cover  
XD20 at 300 e.w. bottom 60mm cover  
apply Ashford's formula to surface of basement slab as per manufacturers instructions

all laps of bars to be staggered

all bars terminating at face of wall to have standard returns unless lapped with wall starters

concrete strength = 35MPa

BASEMENT FLOOR PLAN (LOWER)

1:100



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All discrepancies shall be referred to the Architect for resolution before proceeding with work.

Refer hydraulic drawings for pipe penetrations required through foundations.

Foundation material shall be approved by the Engineer for safe bearing capacity before construction of any footings.

Slab construction joints as shown. Discuss and agree set out of construction joints well in advance of construction with Site Engineer. Refer Specification

Typically all insitu concrete wall elements to be 30 MPa concrete unless noted otherwise.

Typically all precast concrete and precast beams to be 35 MPa concrete unless noted otherwise.

All insitu interfaces and construction joints shall be thoroughly roughened to 5mm amplitude.

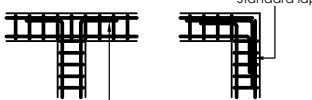
All precast to insitu interfaces and grouted joints shall be thoroughly roughened to 5mm amplitude.

Confirm all lift dimensions with lift manufacturers before commencing construction. Also confirm location of lift pit sumps.

All primary load bearing steelwork (including columns, beams, etc.) will require specific fire rating. Refer to Fire Engineer and/or Architect for requirements, details, and fire rating options.

Refer Specification for waterproofing details to basement slab and walls including protection and guarantee requirements.

All horizontal foundation reinforcing must lap adequately at corners and junctions as indicated below.



Return ends 24 x bar diameter

REV.	DATE	AMENDMENT	BY
A	22/01/08	CONSTRUCTION ISSUE	GPW
5	31/05/07	CONSENT ISSUE	GPW
4	22/03/07	TENDER UPDATE ISSUE	GPW
3	26/02/07	TENDER UPDATE	GPW
2	31/01/07	TENDER ISSUE	GPW
1	21/12/06	FOR CLIENT REVIEW	GPW

ARCHITECT:



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CONSULTING ENGINEERS

PROJECT:

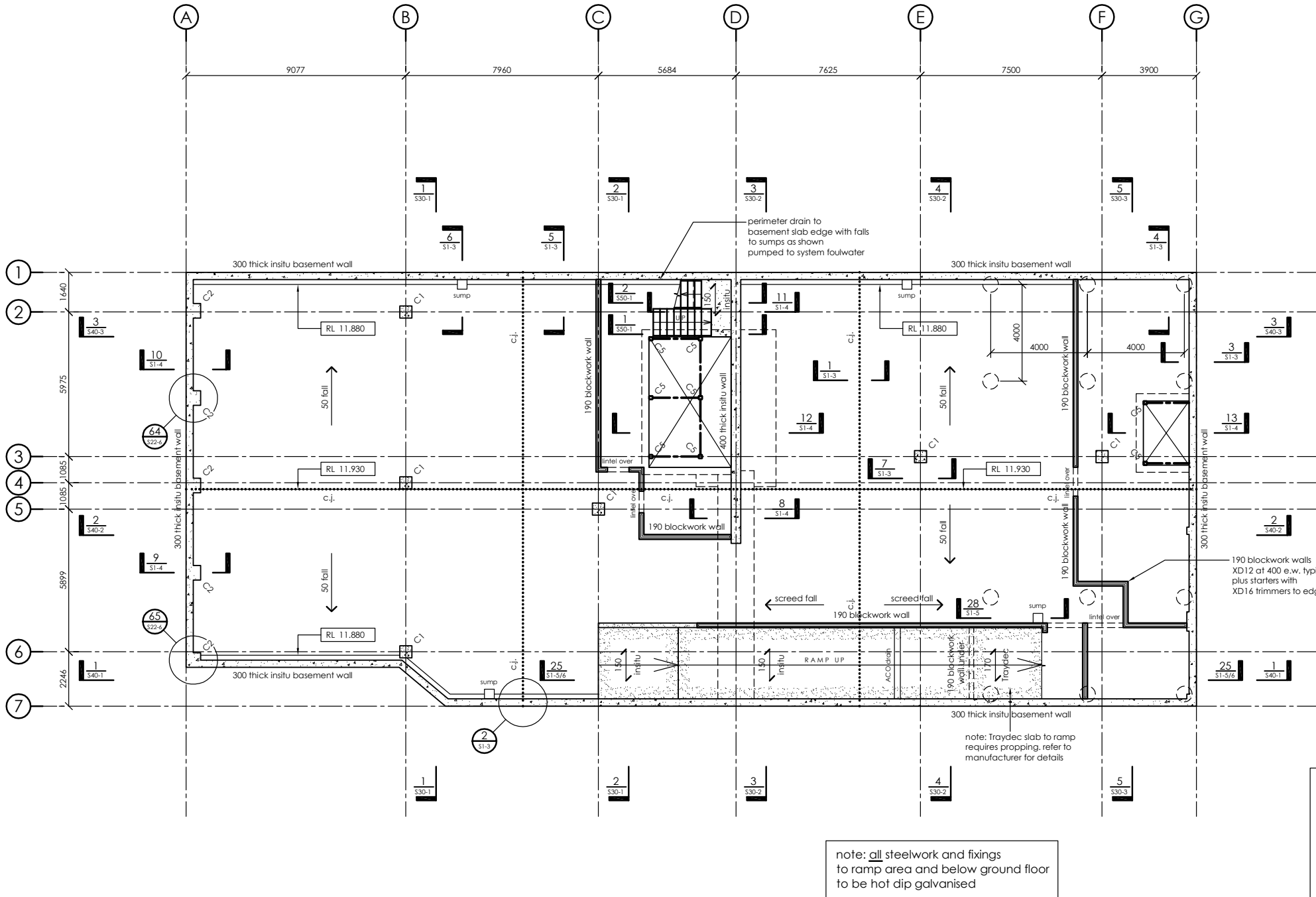
WARNERS NOVOTEL  
CHRISTCHURCH

DRAWING TITLE:

BASEMENT FLOOR PLAN  
(UPPER)

DRAWN: GPW	SCALE:	
ENGINEER: AJW	1:100 @ A1	
CHECKED: CBL	1:200 @ A3	
FILE: 106019	DRAWING NO. S1-2	REV. A

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COLUMN LEGEND

- C1 500 x 500 concrete column (40MPa concrete)
- C2 600 x 600 concrete column
- C3 310 UC 158 steel column
- C4 250 x 9 SHS steel column
- C5 150 x 9 SHS steel column
- C6 89 x 6 SHS steel column
- C7 310 UC 198 steel column
- C8 200 UC 52 steel column
- C9 125 x 9 SHS steel column
- C10 100 x 9 SHS steel column

PILING

- 6500 Helix screw piles
- 5000 deep typically
- i.e. 5000 below underside of basement slab

design - tension capacity of pile group loads under Ultimate Limit State seismic loads to exceed 2000kN

BASEMENT SLAB REINFORCING

(unless noted otherwise)

1000 thick insitu basement raft slab on DPC on 50mm site concrete

XD25 at 200 e.w. top 60mm cover

XD20 at 300 e.w. bottom 60mm cover

apply Ashford's formula to surface of basement slab as per manufacturers instructions

all laps of bars to be staggered

all bars terminating at face of wall to have standard returns unless lapped with wall starters

concrete strength = 35MPa

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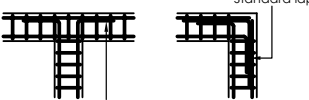
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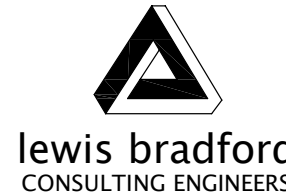
All horizontal foundation reinforcing must lap adequately at corners and junctions as indicated below.



Return ends 24 x bar diameter

A	22/01/08	CONSTRUCTION ISSUE	GPW
1	31/05/07	CONSENT ISSUE	GPW
REV.	DATE	AMENDMENT	BY

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PROJECT:

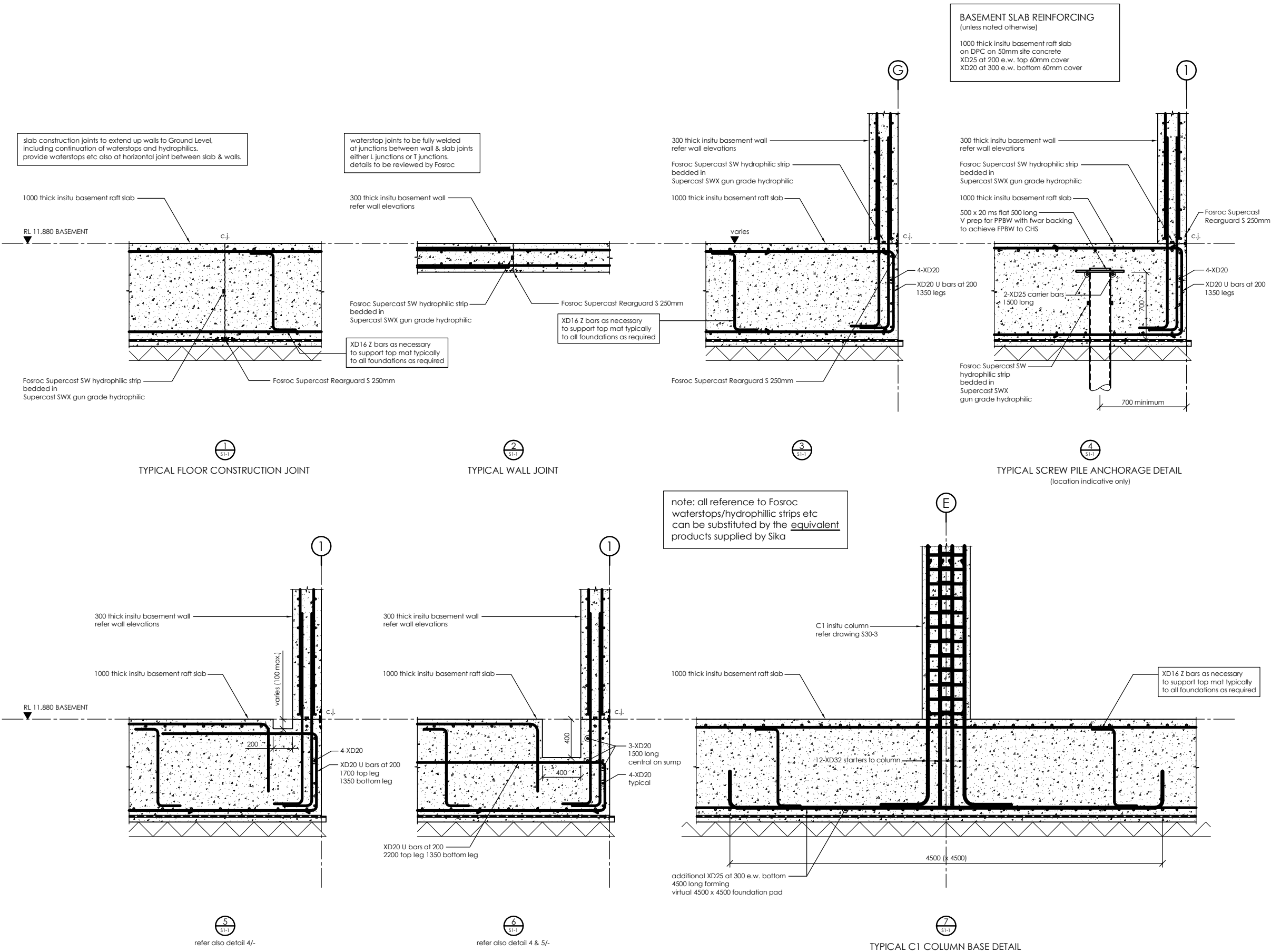
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CHRISTCHURCH

DRAWING TITLE:

BASEMENT DETAILS  
SHEET 1 OF 4

DRAWN: GPW	SCALE:	
ENGINEER: AJW	1:20 @ A1	
CHECKED: CBL	1:40 @ A3	
FILE: 106019	DRAWING NO. S1-3	REV. A

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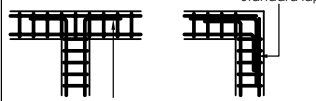
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Confirm all lift dimensions with lift manufacturers before commencing construction. Also confirm location of lift pit sumps.

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Return ends 24 x bar diameter

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1	31/05/07	CONSENT ISSUE	GPW
REV.	DATE	AMENDMENT	BY

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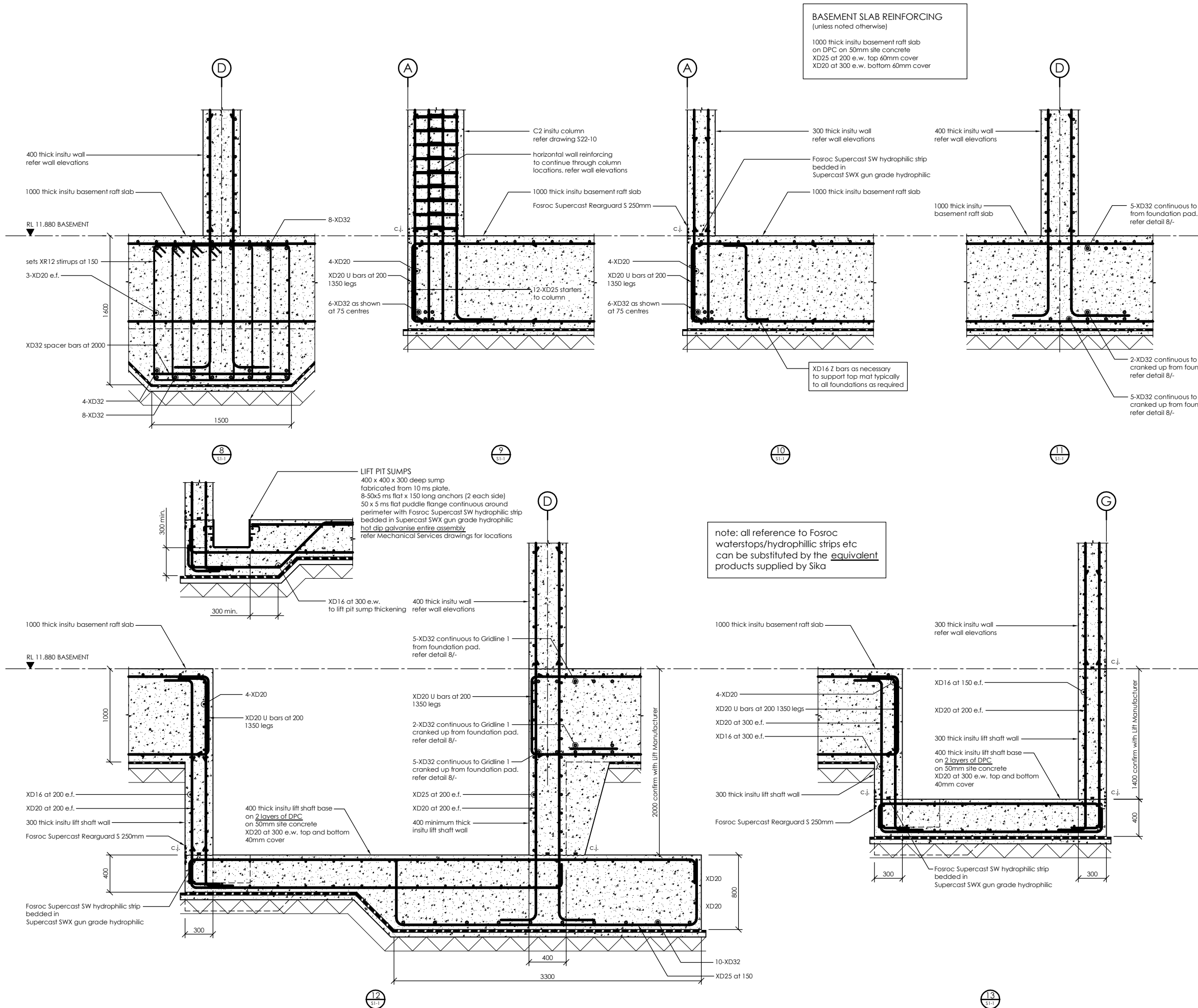
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DRAWING TITLE:

BASEMENT DETAILS  
SHEET 2 OF 4

DRAWN:	GPW	SCALE:	1:20 @ A1
ENGINEER:	AJW		1:40 @ A3
CHECKED:	CBL		
FILE:	106019	DRAWING NO.	S1-4
		REV.	A

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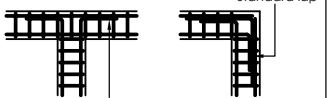
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Return ends 24 x bar diameter

A	22/01/08	CONSTRUCTION ISSUE	GPW
1	31/05/07	CONSENT ISSUE	GPW
REV.	DATE	AMENDMENT	BY

ARCHITECT:



**lewis bradford**  
CONSULTING ENGINEERS

PROJECT:

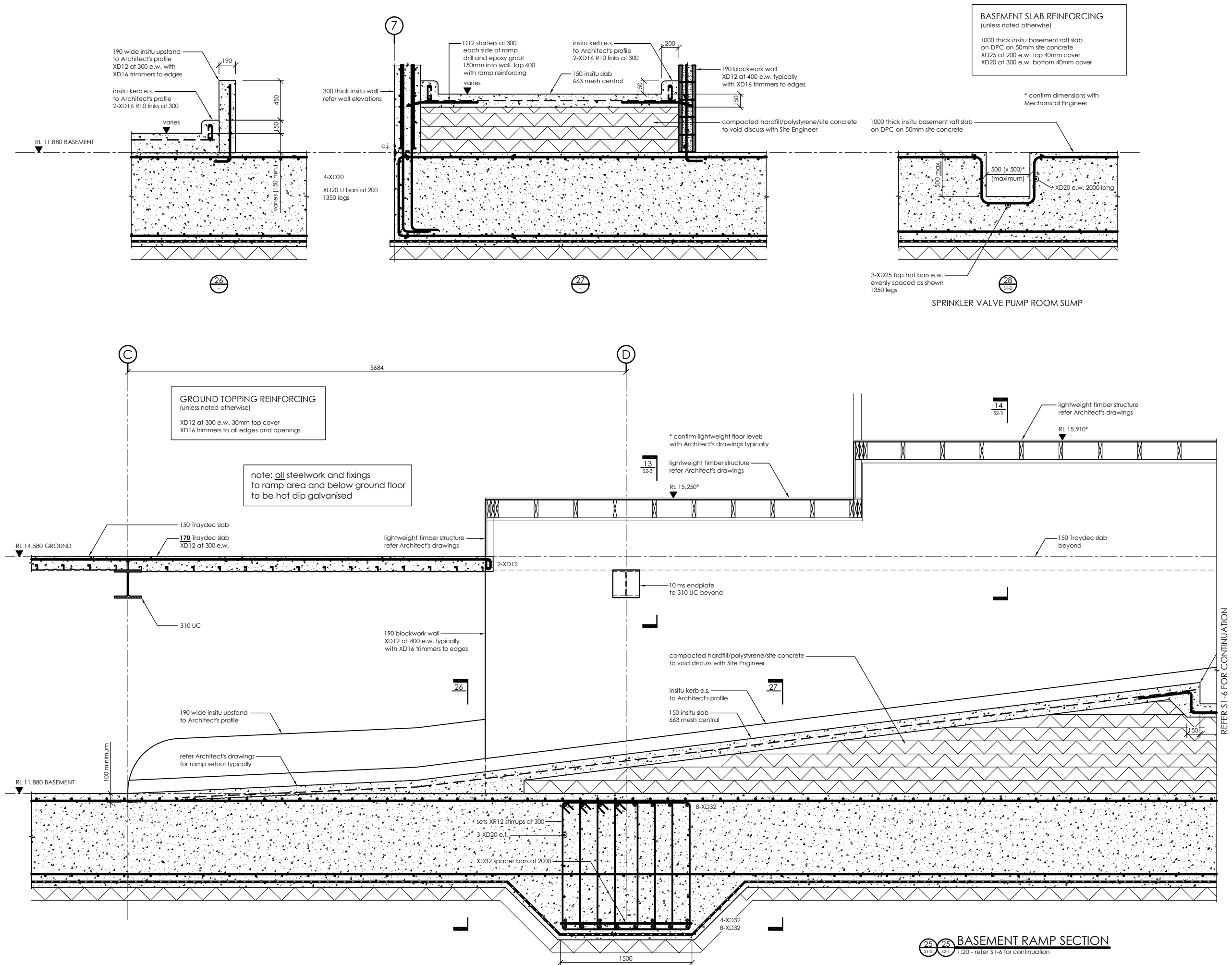
WARNERS NOVOTEL  
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DRAWING TITLE:

BASEMENT DETAILS  
SHEET 3 OF 4  
RAMP SECTION 1 OF 2

DRAWN: GPW	SCALE: 1:20 @ A1 1:40 @ A3	
ENGINEER: AJW		
CHECKED: CBL		
FILE: 106019	DRAWING NO. S1-5	REV. A

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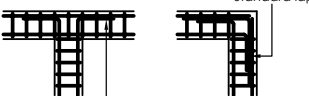
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Refer Specification for waterproofing details to basement slab and walls including protection and guarantee requirements.

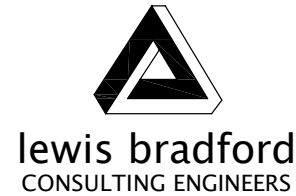
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Return ends 24 x bar diameter

REV.	DATE	AMENDMENT	BY
A	22/01/08	CONSTRUCTION ISSUE	GPW
1	31/05/07	CONSENT ISSUE	GPW

ARCHITECT:



PROJECT:

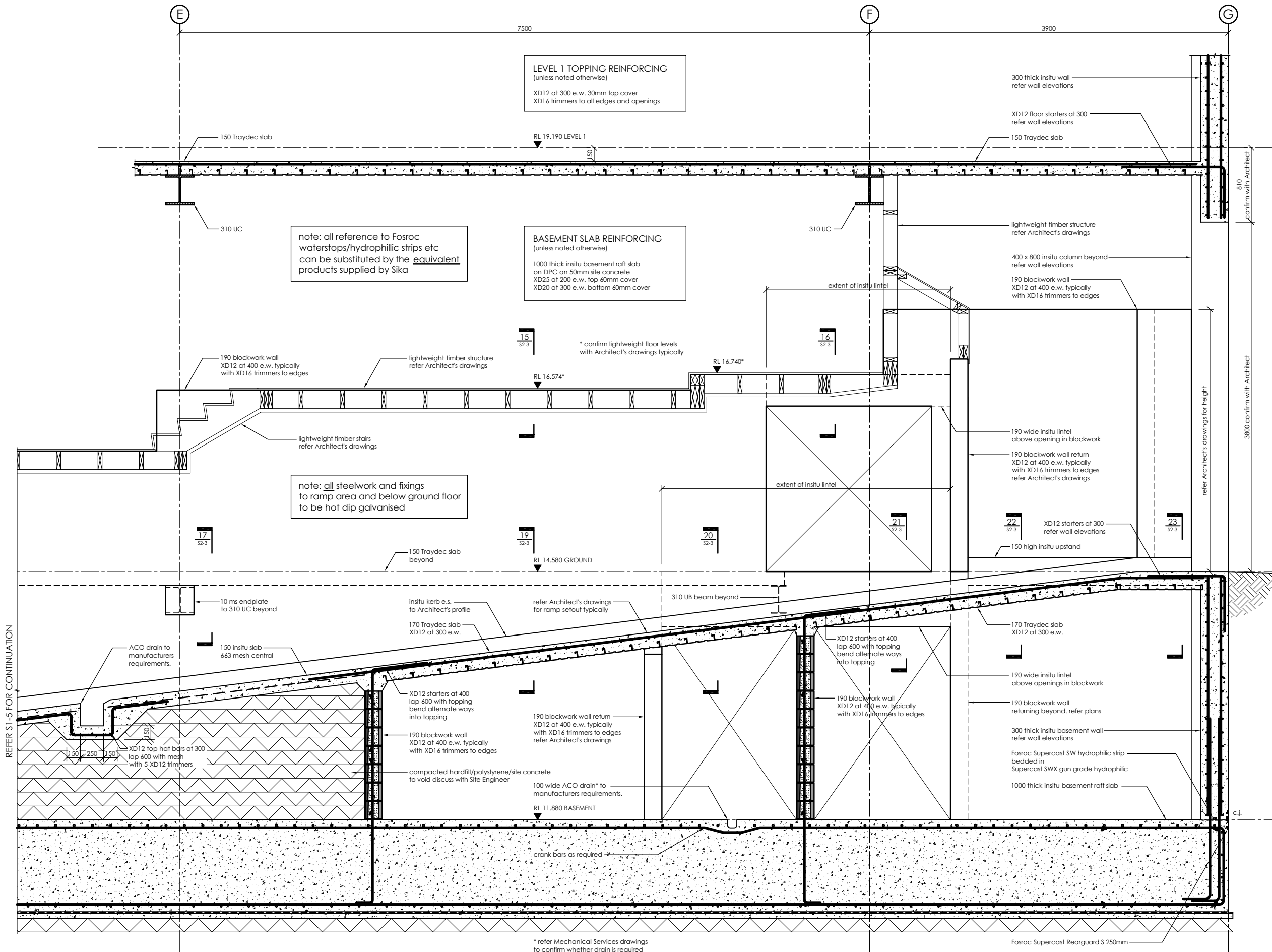
WARNERS NOVOTEL  
CHRISTCHURCH

DRAWING TITLE:

BASEMENT DETAILS  
SHEET 4 OF 4  
RAMP SECTION 2 OF 2

DRAWN:	GPW	SCALE:	1:20 @ A1
ENGINEER:	AJW		1:40 @ A3
CHECKED:	CBL		
FILE:	106019	DRAWING NO.	S1-6
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BASEMENT RAMP SECTION  
1:20 - refer S1-5 for continuation

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All insitu interfaces and construction joints shall be thoroughly roughened to 5mm amplitude.

All precast to insitu interfaces and grouted joints shall be thoroughly roughened to 5mm amplitude.

All insitu walls to have XD starters  
All precast panels to have D starters  
All starters shall lap for full lap length beyond outermost drag bar where applicable

Floor topping bars running parallel to numerical gridlines shall have 30mm top cover (i.e. top bars - refer details)

Confirm all lift dimensions with lift manufacturers before commencing construction. Also confirm location of lift pit sumps.

All primary load bearing steelwork (including columns, beams, etc.) will require specific fire rating. Refer to Fire Engineer and/or Architect for requirements, details, and fire rating options.

Provide 200 nom. Nelson shear studs 100 long to all steel beams u.n.o.  
welded in accordance with AS 1554 Part 2.  
at 150 centres for all primary UC beams  
at 200 centres for all secondary UB beams

Traydec units to typically have 70mm seating onto steel beams/angles/walls and 20mm side sealing

All slab openings shall be trimmed with XD16 bars to all edges extend 600mm past opening u.n.o.

REV.	DATE	AMENDMENT	BY
A	22/01/08	CONSTRUCTION ISSUE	GPW
4	31/05/07	CONSENT ISSUE	GPW
3	22/03/07	TENDER UPDATE ISSUE	GPW
2	31/01/07	TENDER ISSUE	GPW
1	21/12/06	FOR CLIENT REVIEW	GPW

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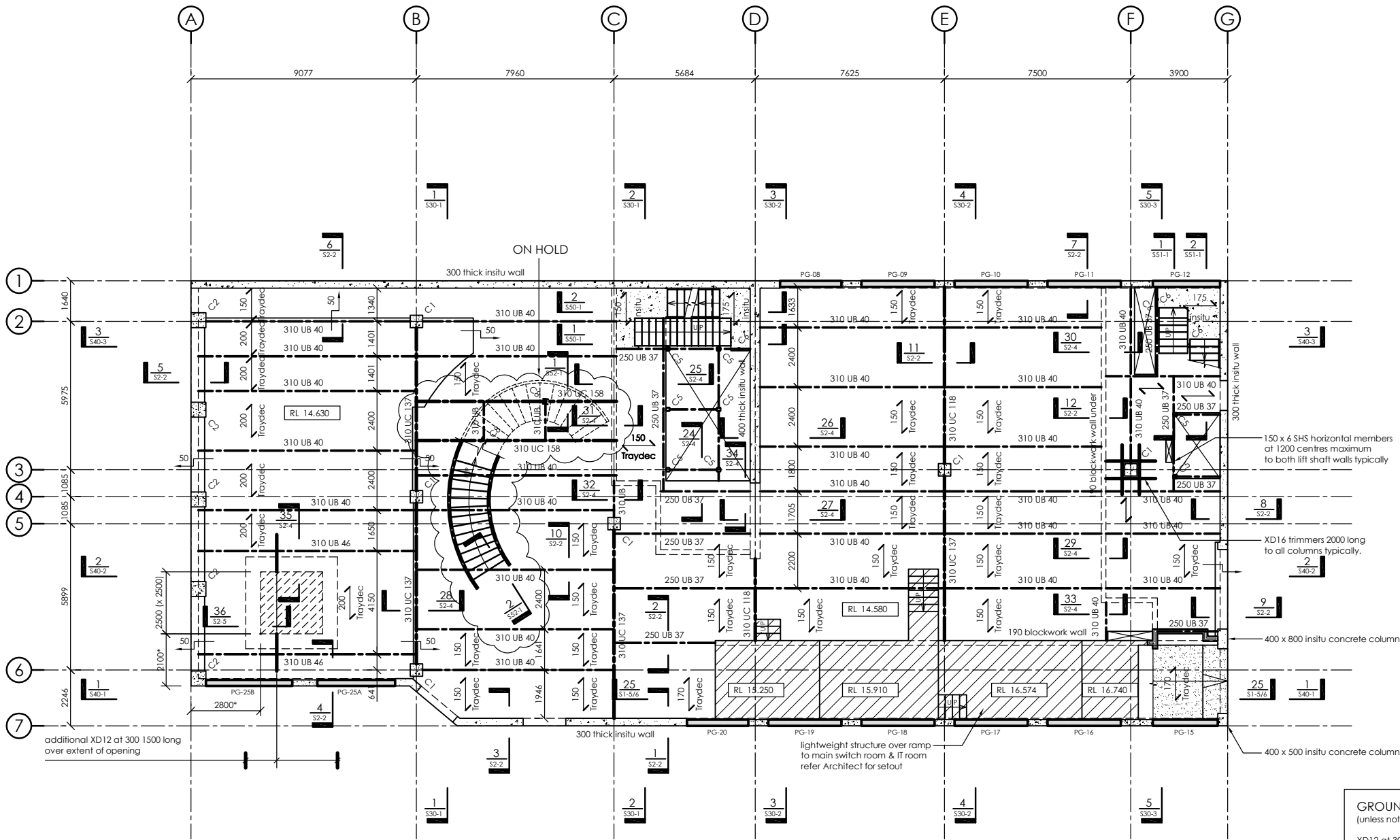
WARNERS NOVOTEL  
CHRISTCHURCH

DRAWING TITLE:

GROUND FLOOR PLAN

DRAWN: GPW	SCALE:	
ENGINEER: AJW	1:100 @ A1	
CHECKED: CBL	1:200 @ A3	
FILE: 106019	DRAWING NO. S2-1	REV. A

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\* setout of 2500 x 2500 area for tower crane with 600mm edge distance to temporary slab edge typical Ground to Level 4, refer details for clarification

note: 170 Traydec (including ramp) and 200 Traydec slabs areas require propping refer manufacturer for details

GROUND FLOOR PLAN  
1:100

GROUND TOPPING REINFORCING  
(unless noted otherwise)

XD12 at 300 e.w. 30mm top cover  
XD16 trimmers to all edges and openings  
all laps of topping bars to be staggered  
all bars terminating at face of wall to have standard returns unless lapped with wall starters  
concrete strength = 25MPa  
note: Traydec units typically to have 70mm seating on steel beams and 20mm side sealing to steel beams

PROPPING

In general Traydec slab (using continuous or double span sheets) does not require propping. Primary UC beams to be propped typically. 310 UC beams to be cambered 20mm upwards typically. Secondary UB beams to be propped at quarter points and cambered 15mm upwards typically. Secondary UC beams to be propped and cambered 10mm upwards typically.

recess 25mm slab recess for showers typically. refer Architect's drawings



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Floor topping bars running parallel to numerical gridlines shall have 30mm top cover (i.e. top bars - refer details)

Confirm all lift dimensions with lift manufacturers before commencing construction. Also confirm location of lift pit sumps.

All primary load bearing steelwork (including columns, beams, etc.) will require specific fire rating. Refer to Fire Engineer and/or Architect for requirements, details, and fire rating options.

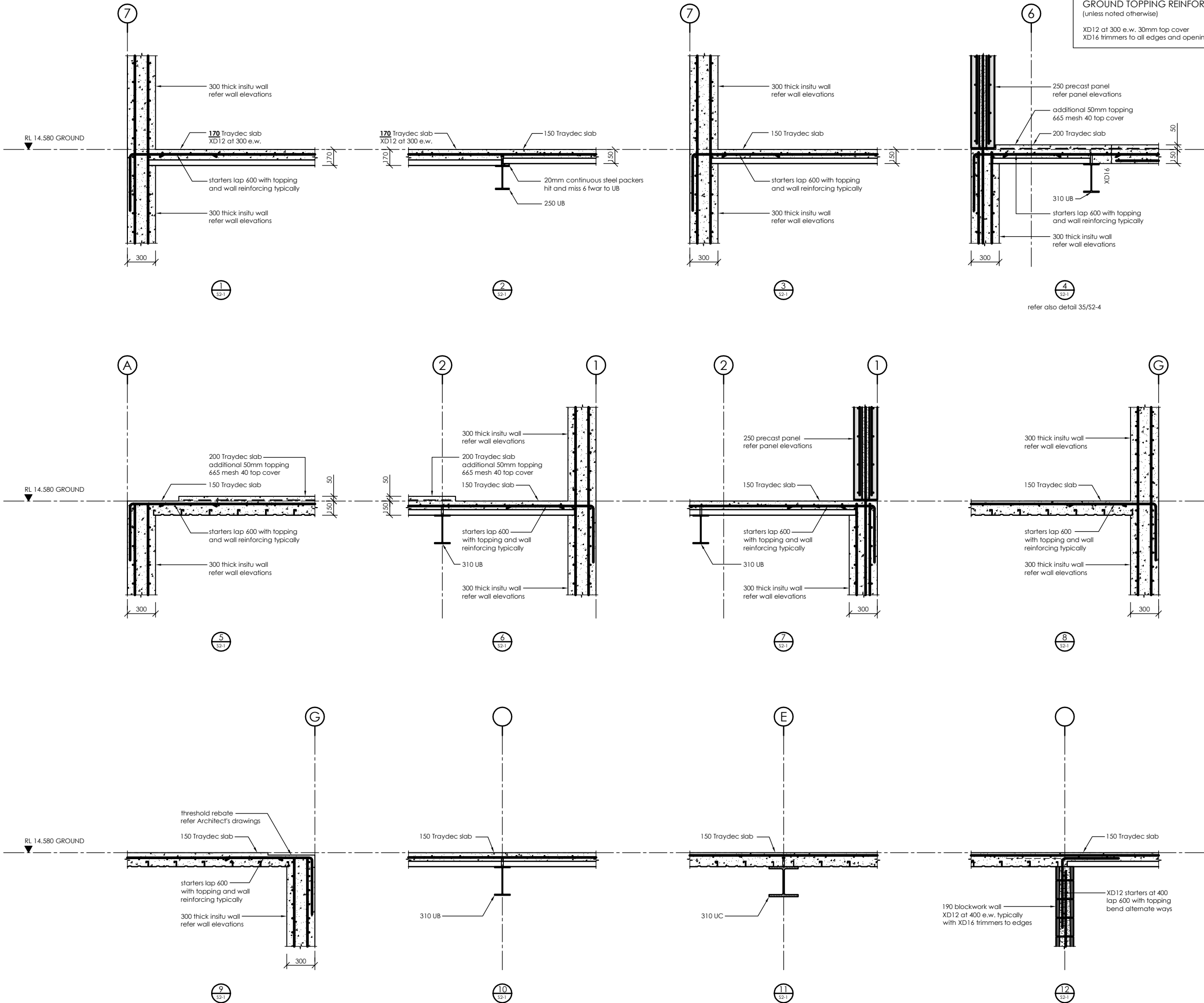
Provide 200 nom. Nelson shear studs 100 long to all steel beams u.n.o.  
welded in accordance with AS 1554 Part 2.  
at 150 centres for all primary UC beams  
at 200 centres for all secondary UB beams

Traydec units to typically have 70mm seating onto steel beams/angles/walls and 20mm side seating

All slab openings shall be trimmed with XD16 bars to all edges extend 600mm past opening u.n.o.

GROUND TOPPING REINFORCING  
(unless noted otherwise)

XD12 at 300 e.w. 30mm top cover  
XD16 trimmers to all edges and openings



REV.	DATE	AMENDMENT	BY
A	22/01/08	CONSTRUCTION ISSUE	GPW
2	31/05/07	CONSENT ISSUE	GPW
1	31/01/07	TENDER ISSUE	GPW

ARCHITECT:



lewis bradford  
CONSULTING ENGINEERS

PROJECT:

WARNERS NOVOTEL  
CHRISTCHURCH

DRAWING TITLE:

GROUND FLOOR DETAILS  
SHEET 1 OF 4

DRAWN:	GPW	SCALE:	1:20 @ A1
ENGINEER:	AJW		1:40 @ A3
CHECKED:	CBL		
FILE:	106019	DRAWING NO.	S2-2
		REV.	A

CONTRACTOR TO VERIFY ALL DIMENSIONS ON SITE  
REFER TO ARCHITECT'S DRAWING FOR ALL SETOUTS

NOTES :

Refer notes sheet at the start of drawing set for notes typically

Refer Architects drawings for all set out dimensions, opening sizes, slab set downs, rebates, insitu nibs, upstands, sealants etc.

All discrepancies shall be referred to the Architect for resolution before proceeding with work.

Typically all insitu concrete wall elements to be 30 MPa concrete unless noted otherwise.

Typically all precast concrete and precast beams to be 35 MPa concrete unless noted otherwise.

All insitu interfaces and construction joints shall be thoroughly roughened to 5mm amplitude.

All precast to insitu interfaces and grouted joints shall be thoroughly roughened to 5mm amplitude.

All insitu walls to have XD starters  
All precast panels to have D starters  
All starters shall lap for full lap length beyond  
outermost drag bar where applicable

Floor topping bars running parallel to numerical gridlines shall have 30mm top cover  
(i.e. top bars - refer details)

Confirm all lift dimensions with lift manufacturers before commencing construction. Also confirm location of lift pit sumps.

All primary load bearing steelwork (including columns, beams, etc.) will require specific fire rating. Refer to Fire Engineer and/or Architect for requirements, details, and fire rating options.

Provide 200 nom. Nelson shear studs 100 long  
to all steel beams u.n.o.  
welded in accordance with AS 1554 Part 2.  
at 150 centres for all primary UC beams  
at 200 centres for all secondary UB beams

Traydec units to typically have  
70mm seating onto steel beams/angles/walls  
and 20mm side seating

All slab openings shall be trimmed with XD16 bars to all edges extend 600mm past opening u.n.o.

A	22/01/08	CONSTRUCTION ISSUE	GPW
2	31/05/07	CONSENT ISSUE	GPW
1	31/01/07	TENDER ISSUE	GPW
REV.	DATE	AMENDMENT	BY

ARCHITECT:



**lewis bradford**  
CONSULTING ENGINEERS

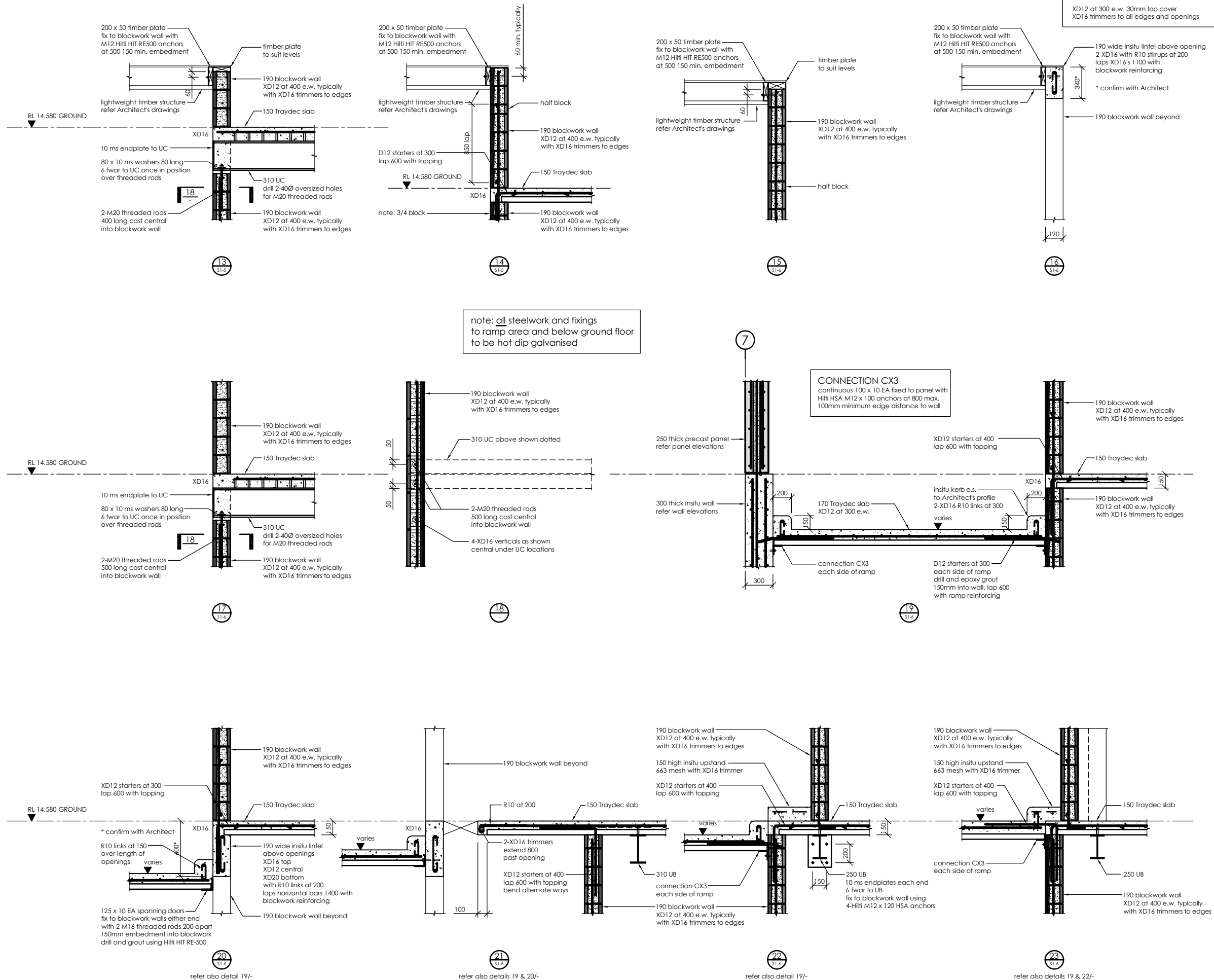
PROJECT:

WARNERS NOVOTEL  
CHRISTCHURCH

DRAWING TITLE:

GROUND FLOOR DETAILS  
SHEET 2 OF 4

DRAWN: GPW	SCALE: 1:20 @ A1 1:40 @ A3	
ENGINEER: AJW		
CHECKED: CBL		
FILE: 106019	DRAWING NO. S2-3	REV. A



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Typically all insitu concrete wall elements to be 30 MPa concrete unless noted otherwise.

Typically all precast concrete and precast beams to be 35 MPa concrete unless noted otherwise.

All insitu interfaces and construction joints shall be thoroughly roughened to 5mm amplitude.

All precast to insitu interfaces and grouted joints shall be thoroughly roughened to 5mm amplitude.

All insitu walls to have XD starters  
All precast panels to have D starters  
All starters shall lap for full lap length beyond  
outermost drag bar where applicable

Floor topping bars running parallel to numerical gridlines shall have 30mm top cover (i.e. top bars - refer details)

Confirm all lift dimensions with lift manufacturers before commencing construction. Also confirm location of lift pit sumps.

All primary load bearing steelwork (including columns, beams, etc.) will require specific fire rating. Refer to Fire Engineer and/or Architect for requirements, details, and fire rating options.

Provide 20Ø nom. Nelson shear studs 100 long  
to all steel beams u.n.o.  
welded in accordance with AS 1554 Part 2.  
at 150 centres for all primary UC beams  
at 200 centres for all secondary UB beams

Traydec units to typically have  
70mm seating onto steel beams/angles/walls  
and 20mm side seating

All slab openings shall be trimmed with XD16 bars  
to all edges extend 600mm past opening u.n.o.

A	22/01/08	CONSTRUCTION ISSUE	GPW
1	31/05/07	CONSENT ISSUE	GPW
REV.	DATE	AMENDMENT	BY

ARCHITECT:



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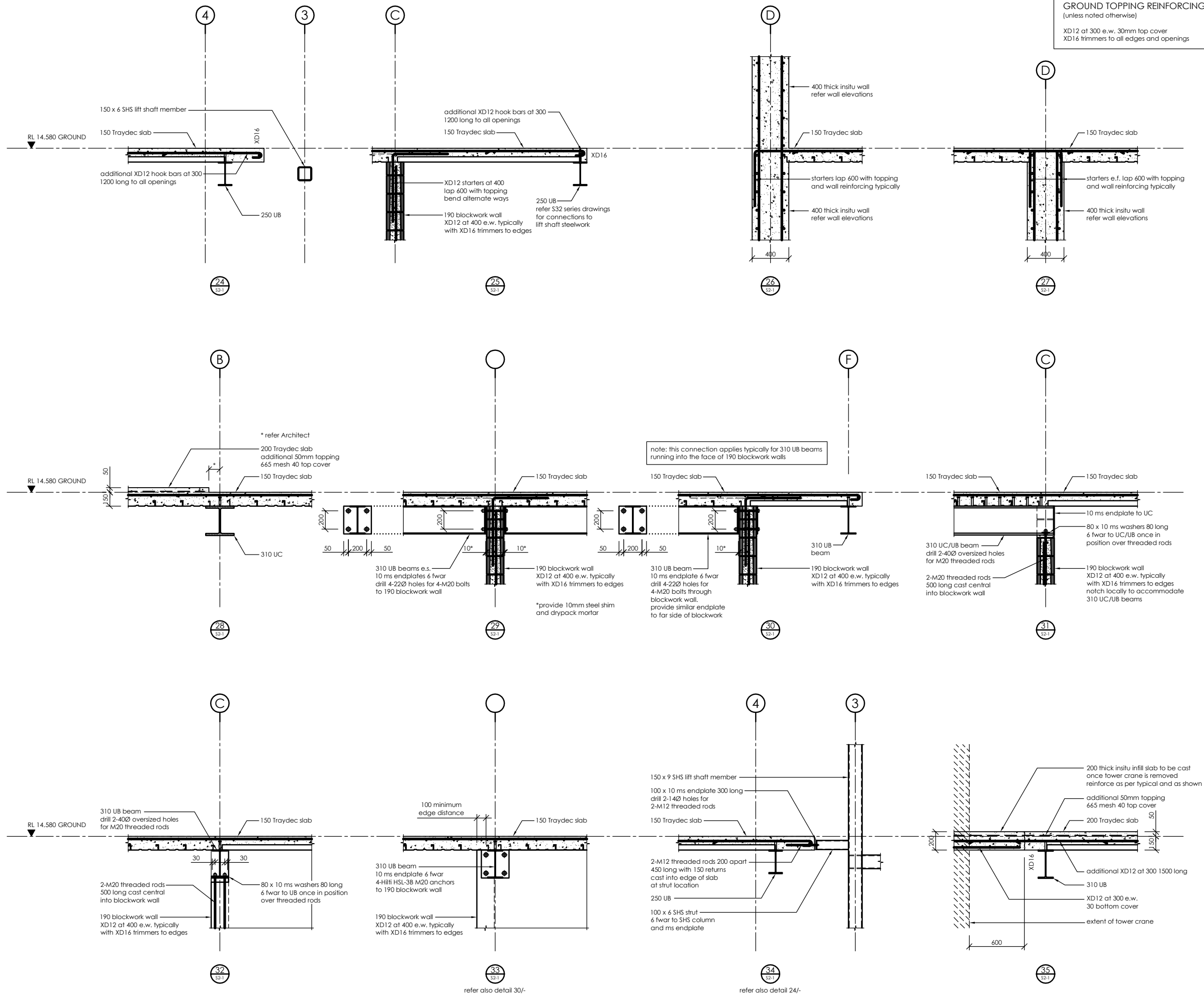
PROJECT:

WARNERS NOVOTEL  
CHRISTCHURCH

DRAWING TITLE:

GROUND FLOOR DETAILS  
SHEET 3 OF 4

DRAWN: GPW	SCALE: 1:20 @ A1 1:40 @ A3	
ENGINEER: AJW		
CHECKED: CBL		
FILE: 106019	DRAWING NO. S2-4	REV. A





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Typically all insitu concrete wall elements to be 30 MPa concrete unless noted otherwise.

Typically all precast concrete and precast beams to be 35 MPa concrete unless noted otherwise.

All insitu interfaces and construction joints shall be thoroughly roughened to 5mm amplitude.

All precast to insitu interfaces and grouted joints shall be thoroughly roughened to 5mm amplitude.

All insitu walls to have XD starters  
All precast panels to have D starters  
All starters shall lap for full lap length beyond outermost drag bar where applicable

Floor topping bars running parallel to numerical gridlines shall have 30mm top cover (i.e. top bars - refer details)

Confirm all lift dimensions with lift manufacturers before commencing construction. Also confirm location of lift pit sumps.

All primary load bearing steelwork (including columns, beams, etc.) will require specific fire rating. Refer to Fire Engineer and/or Architect for requirements, details, and fire rating options.

Provide 200 nom. Nelson shear studs 100 long to all steel beams u.n.o.  
welded in accordance with AS 1554 Part 2.  
at 150 centres for all primary UC beams  
at 200 centres for all secondary UB beams

Traydec units to typically have 70mm seating onto steel beams/angles/walls and 20mm side seating

All slab openings shall be trimmed with XD16 bars to all edges extend 600mm past opening u.n.o.

A	22/01/08	CONSTRUCTION ISSUE	GPW
REV.	DATE	AMENDMENT	BY

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PROJECT:

WARNERS NOVOTEL  
CHRISTCHURCH

DRAWING TITLE:

GROUND FLOOR DETAILS  
SHEET 4 OF 4

DRAWN: GPW	SCALE:	
ENGINEER: AJW	1:20 @ A1	
CHECKED: CBL	1:40 @ A3	
FILE: 106019	DRAWING NO. S2-5	REV. A

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All discrepancies shall be referred to the Architect for resolution before proceeding with work.

Typically all insitu concrete wall elements to be 30 MPa concrete unless noted otherwise.

Typically all precast concrete and precast beams to be 35 MPa concrete unless noted otherwise.

All insitu interfaces and construction joints shall be thoroughly roughened to 5mm amplitude.

All precast to insitu interfaces and grouted joints shall be thoroughly roughened to 5mm amplitude.

All insitu walls to have XD starters  
All precast panels to have D starters  
All starters shall lap for full lap length beyond outermost drag bar where applicable

Floor topping bars running parallel to numerical gridlines shall have 30mm top cover (i.e. top bars - refer details)

Confirm all lift dimensions with lift manufacturers before commencing construction. Also confirm location of lift pit sumps.

All primary load bearing steelwork (including columns, beams, etc.) will require specific fire rating. Refer to Fire Engineer and/or Architect for requirements, details, and fire rating options.

Provide 200 nom. Nelson shear studs 100 long to all steel beams u.n.o.  
welded in accordance with AS 1554 Part 2.  
at 150 centres for all primary UC beams  
at 200 centres for all secondary UB beams

Traydec units to typically have 70mm seating onto steel beams/angles/walls and 20mm side seating

All slab openings shall be trimmed with XD16 bars to all edges extend 600mm past opening u.n.o.

REV.	DATE	AMENDMENT	BY
A	22/01/08	CONSTRUCTION ISSUE	GPW
4	31/05/07	CONSENT ISSUE	GPW
3	22/03/07	TENDER UPDATE ISSUE	GPW
2	31/01/07	TENDER ISSUE	GPW
1	21/12/06	FOR CLIENT REVIEW	GPW

ARCHITECT:



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PROJECT:

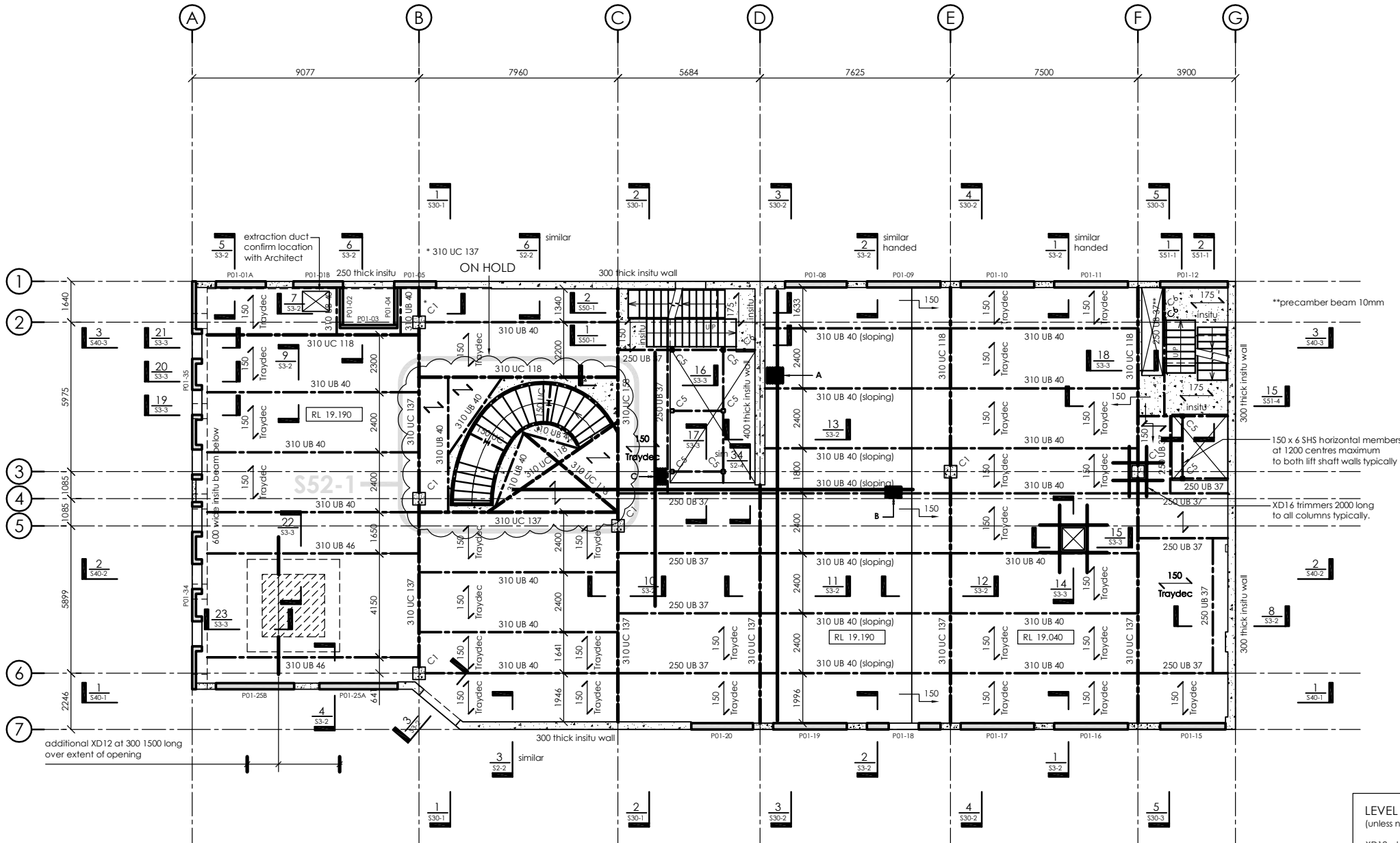
WARNERS NOVOTEL  
CHRISTCHURCH

DRAWING TITLE:

LEVEL 1 FLOOR PLAN

DRAWN: GPW	SCALE:	
ENGINEER: AJW	1:100 @ A1	
CHECKED: CBL	1:200 @ A3	
FILE: 106019	DRAWING NO. S3-1	REV. A

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note: thicker area of Traydec slab  
between Gridlines D & E will require propping

LEVEL 1 FLOOR PLAN  
1:100

LEVEL 1 DRAG BARS

- A 7-XD20 at 60 central full width
- B 5-XD16 at 60 central 16000 long central on lift void opening  
note: bars run under A & C drag bars
- C 5-XD20 at 60 central 10000 long

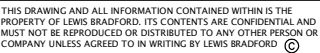
LEVEL 1 TOPPING REINFORCING  
(unless noted otherwise)

XD12 at 300 e.w. 30mm top cover  
XD16 trimmers to all edges and openings  
  
all laps of topping bars to be staggered  
  
all bars terminating at face of wall to have standard returns unless lapped with wall starters  
  
concrete strength = 25MPa  
  
note: Traydec units typically to have 70mm seating on steel beams and 20mm side seating to steel beams

PROPPING

In general Traydec slab (using continuous or double span sheets) does not require propping. Primary UC beams to be propped typically. 310 UC beams to be cambered 20mm upwards typically. Secondary UB beams to be propped at quarter points and cambered 15mm upwards typically. Secondary UC beams to be propped and cambered 10mm upwards typically.

recess 25mm slab recess for showers typically.  
refer Architect's drawings



CONTRACTOR TO VERIFY ALL DIMENSIONS ON SITE

NOTES :

Refer notes sheet at the start of drawing set for notes typically

Refer Architects drawings for all set out dimensions, opening sizes, slab set downs, rebates, insitu nibs, upstands, sealants etc.

All discrepancies shall be referred to the Architect for resolution before proceeding with work.

Typically all insitu concrete wall elements to be 30 MPa concrete unless noted otherwise.

Typically all precast concrete and precast beams to be 35 MPa concrete unless noted otherwise.

All insitu interfaces and construction joints shall be thoroughly roughened to 5mm amplitude.

All precast to insitu interfaces and grouted joints shall be thoroughly roughened to 5mm amplitude.

All insitu walls to have XD starters  
All precast panels to have D starters  
All starters shall lap for full lap length beyond  
outermost drag bar where applicable

Floor topping bars running parallel to numerical gridlines shall have 30mm top cover (i.e. top bars - refer details)

Confirm all lift dimensions with lift manufacturers before commencing construction. Also confirm location of lift pit sumps.

All primary load bearing steelwork (including columns, beams, etc.) will require specific fire rating. Refer to Fire Engineer and/or Architect for requirements, details, and fire rating options.

Provide 200 nom. Nelson shear studs 100 long  
to all steel beams u.n.o.  
welded in accordance with AS 1554 Part 2.  
at 150 centres for all primary UC beams  
at 200 centres for all secondary UB beams

Traydec units to typically have  
70mm seating onto steel beams/angles/walls  
and 20mm side seating

All slab openings shall be trimmed with XD16 bars to all edges extend 600mm past opening u.n.o.

A	22/01/08	CONSTRUCTION ISSUE	GPW
1	31/05/07	CONSENT ISSUE	GPW
REV.	DATE	AMENDMENT	BY

ARCHITECT:



**lewis bradford**  
CONSULTING ENGINEERS

PROJECT:

WARNERS NOVOTEL  
CHRISTCHURCH

DRAWING TITLE:

LEVEL 1 DETAILS  
SHEET 1 OF 2

DRAWN: GPW	SCALE: 1:20 @ A1 1:40 @ A3	
ENGINEER: AJW		
CHECKED: CBL		
FILE: 106019	DRAWING NO. S3-2	REV. A



CONTRACTOR TO VERIFY ALL DIMENSIONS ON SITE  
REFER TO ARCHITECT'S DRAWING FOR ALL SETOUTS

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All discrepancies shall be referred to the Architect for resolution before proceeding with work.

Typically all insitu concrete wall elements to be 30 MPa concrete unless noted otherwise.

Typically all precast concrete and precast beams to be 35 MPa concrete unless noted otherwise.

All insitu interfaces and construction joints shall be thoroughly roughened to 5mm amplitude.

All precast to insitu interfaces and grouted joints shall be thoroughly roughened to 5mm amplitude.

All insitu walls to have XD starters  
All precast panels to have D starters  
All starters shall lap for full lap length beyond  
outermost drag bar where applicable

Floor topping bars running parallel to numerical gridlines shall have 30mm top cover (i.e. top bars - refer details)

Confirm all lift dimensions with lift manufacturers before commencing construction. Also confirm location of lift pit sumps.

All primary load bearing steelwork (including columns, beams, etc.) will require specific fire rating. Refer to Fire Engineer and/or Architect for requirements, details, and fire rating options.

Provide 200 nom. Nelson shear studs 100 long  
to all steel beams u.n.o.  
welded in accordance with AS 1554 Part 2.  
at 150 centres for all primary UC beams  
at 200 centres for all secondary UB beams

Traydec units to typically have  
70mm seating onto steel beams/angles/walls  
and 20mm side seating

All slab openings shall be trimmed with XD16 bars to all edges extend 600mm past opening u.n.o.

A	22/01/08	CONSTRUCTION ISSUE	GPW
1	31/05/07	CONSENT ISSUE	GPW
REV.	DATE	AMENDMENT	BY

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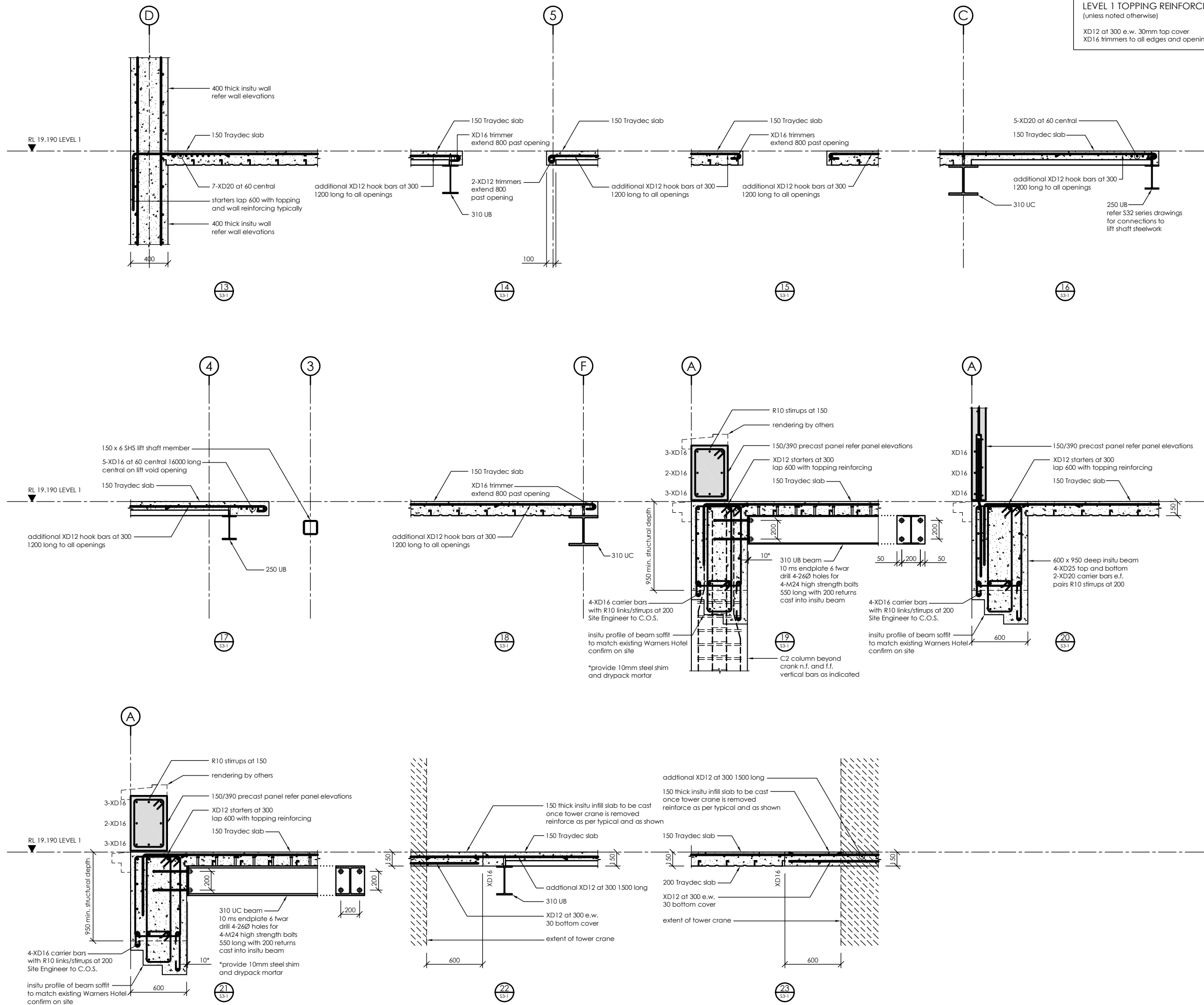
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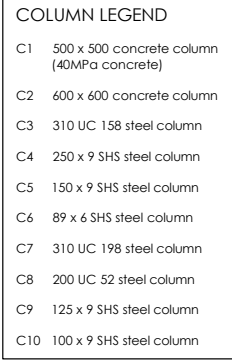
WARNERS NOVOTEL  
CHRISTCHURCH

DRAWING TITLE:

LEVEL 1 DETAILS  
SHEET 2 OF 2

DRAWN: <b>GPW</b>	SCALE:  1:20 @ A1  1:40 @ A3	
ENGINEER: <b>AJW</b>		
CHECKED: <b>CBL</b>		
FILE: <b>106019</b>	DRAWING NO. <b>S3-3</b>	REV. <b>A</b>





All slab openings shall be trimmed with XD16 bars to all edges extend 600mm past opening u.n.o.

A	22/01/08	CONSTRUCTION ISSUE	GPW
4	31/05/07	CONSENT ISSUE	GPW
3	22/03/07	TENDER UPDATE ISSUE	GPW
2	21/01/07	TENDER ISSUE	GPW
1	21/12/06	FOR CLIENT REVIEW	GPW
REV.	DATE	AMENDMENT	BY



WARNERS NOVOTEL  
CHRISTCHURCH

## LEVEL 2 FLOOR PLAN

DRAWN: <b>GPW</b>	SCALE:  1:100 @ A1  1:200 @ A3	
ENGINEER: <b>AJW</b>		
CHECKED: <b>CBL</b>		
FILE: <b>106019</b>	DRAWING NO. <b>S4-1</b>	REV. <b>A</b>

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## 1:100

**A** 7-XD20 at 60 central full width

**B** 5-XD16 at 60 central 16000 long  
central on lift void opening  
note: bars run under **A** & **C** drag bars

note: Traydec units typically to have  
70mm seating on steel beams  
and 20mm side seating to steel beams

In general Traydec slab (using continuous or double span sheets) does not require propping. Primary UC beams to be propped typically. 310 UC beams to be cambered 20mm upwards typically. Secondary UB beams to be propped at quarter points and cambered 15mm upwards typically. Secondary UC beams to be propped and cambered 10mm upwards typically.

recess 25mm slab recess for showers typically.  
refer Architect's drawings

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CONTRACTOR TO VERIFY ALL DIMENSIONS ON SITE REFER TO ARCHITECT'S DRAWING FOR ALL SETOUTS

NOTES :

Refer notes sheet at the start of drawing set for notes typically

Refer Architects drawings for all set out dimensions, opening sizes, slab set downs, rebates, insitu nibs, upstands, sealants etc.

All discrepancies shall be referred to the Architect for resolution before proceeding with work.

Typically all insitu concrete wall elements to be 30 MPa concrete unless noted otherwise.

Typically all precast concrete and precast beams to be 35 MPa concrete unless noted otherwise.

All insitu interfaces and construction joints shall be thoroughly roughened to 5mm amplitude.

All precast to insitu interfaces and grouted joints shall be thoroughly roughened to 5mm amplitude.

All insitu walls to have XD starters  
All precast panels to have D starters  
All starters shall lap for full lap length beyond outermost drag bar where applicable

Floor topping bars running parallel to numerical gridlines shall have 30mm top cover (i.e. top bars - refer details)

Confirm all lift dimensions with lift manufacturers before commencing construction. Also confirm location of lift pit sumps.

All primary load bearing steelwork (including columns, beams, etc.) will require specific fire rating. Refer to Fire Engineer and/or Architect for requirements, details, and fire rating options.

Provide 200 nom. Nelson shear studs 100 long to all steel beams u.n.o.  
welded in accordance with AS 1554 Part 2.  
at 150 centres for all primary UC beams  
at 200 centres for all secondary UB beams

Traydec units to typically have 70mm seating onto steel beams/angles/walls and 20mm side seating

All slab openings shall be trimmed with XD16 bars to all edges extend 600mm past opening u.n.o.

REV.	DATE	AMENDMENT	BY
A	22/01/08	CONSTRUCTION ISSUE	GPW
1	31/05/07	CONSENT ISSUE	GPW

ARCHITECT:



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CONSULTING ENGINEERS

PROJECT:

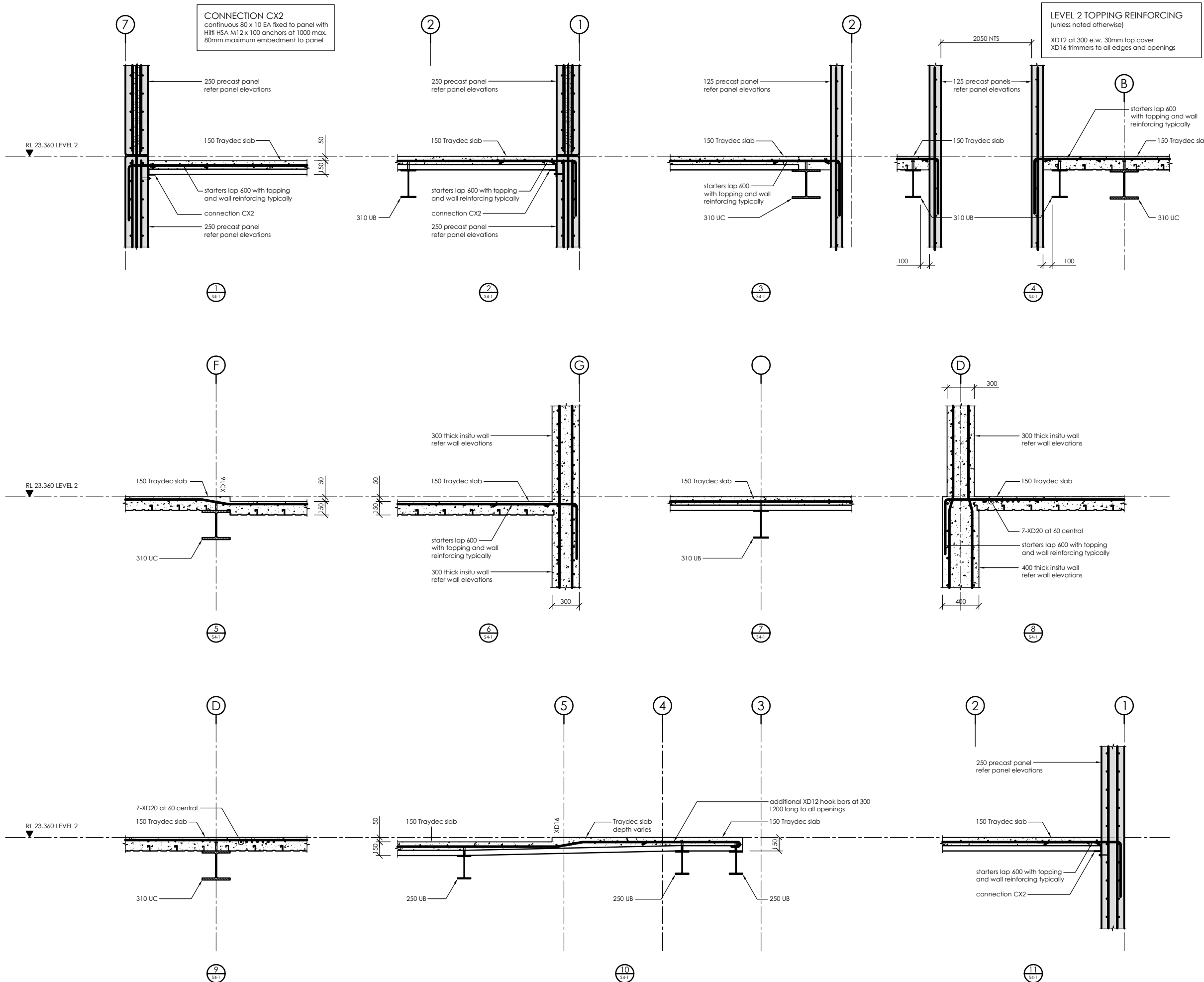
WARNERS NOVOTEL  
CHRISTCHURCH

DRAWING TITLE:

LEVEL 2 DETAILS  
SHEET 1 OF 2

DRAWN: GPW	SCALE: 1:20 @ A1	REV. A
ENGINEER: AJW	1:40 @ A3	
CHECKED: CBL		
FILE: 106019	DRAWING NO. S4-2	

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All precast panels to have D starters  
All starters shall lap for full lap length beyond outermost drag bar where applicable

Floor topping bars running parallel to numerical gridlines shall have 30mm top cover (i.e. top bars - refer details)

Confirm all lift dimensions with lift manufacturers before commencing construction. Also confirm location of lift pit sumps.

All primary load bearing steelwork (including columns, beams, etc.) will require specific fire rating. Refer to Fire Engineer and/or Architect for requirements, details, and fire rating options.

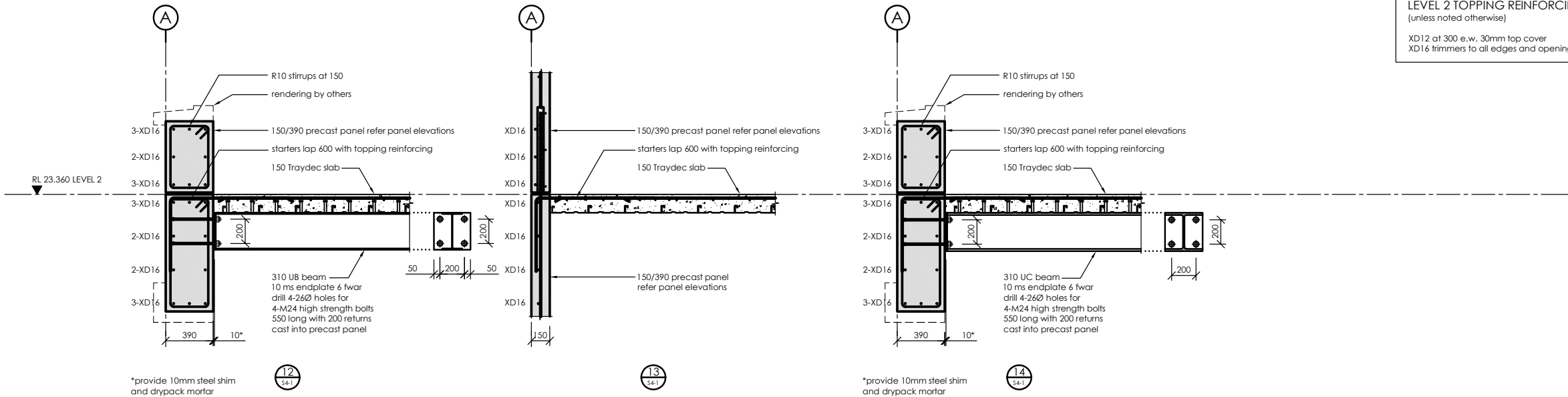
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welded in accordance with AS 1554 Part 2.  
at 150 centres for all primary UC beams  
at 200 centres for all secondary UB beams

Traydec units to typically have 70mm seating onto steel beams/angles/walls and 20mm side seating

All slab openings shall be trimmed with XD16 bars to all edges extend 600mm past opening u.n.o.

LEVEL 2 TOPPING REINFORCING  
(unless noted otherwise)

XD12 at 300 e.w. 30mm top cover  
XD16 trimmers to all edges and openings



A	22/01/08	CONSTRUCTION ISSUE	GPW
REV.	DATE	AMENDMENT	BY

ARCHITECT:



lewis bradford  
CONSULTING ENGINEERS

PROJECT:

WARNERS NOVOTEL  
CHRISTCHURCH

DRAWING TITLE:

LEVEL 2 DETAILS  
SHEET 2 OF 2

DRAWN: GPW	SCALE:	
ENGINEER: AJW	1:20 @ A1	
CHECKED: CBL	1:40 @ A3	
FILE: 106019	DRAWING NO. S4-3	REV. A

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All insitu interfaces and construction joints shall be thoroughly roughened to 5mm amplitude.

All precast to insitu interfaces and grouted joints shall be thoroughly roughened to 5mm amplitude.

All insitu walls to have XD starters  
All precast panels to have D starters  
All starters shall lap for full lap length beyond outermost drag bar where applicable

Floor topping bars running parallel to numerical gridlines shall have 30mm top cover (i.e. top bars - refer details)

Confirm all lift dimensions with lift manufacturers before commencing construction. Also confirm location of lift pit sumps.

All primary load bearing steelwork (including columns, beams, etc.) will require specific fire rating. Refer to Fire Engineer and/or Architect for requirements, details, and fire rating options.

Provide 200 nom. Nelson shear studs 100 long to all steel beams u.n.o.  
welded in accordance with AS 1554 Part 2.  
at 150 centres for all primary UC beams  
at 200 centres for all secondary UB beams

Traydec units to typically have 70mm seating onto steel beams/angles/walls and 20mm side seating

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REV.	DATE	AMENDMENT	BY
A	22/01/08	CONSTRUCTION ISSUE	GPW
4	31/05/07	CONSENT ISSUE	GPW
3	22/03/07	TENDER UPDATE ISSUE	GPW
2	31/01/07	TENDER ISSUE	GPW
1	21/12/06	FOR CLIENT REVIEW	GPW

ARCHITECT:



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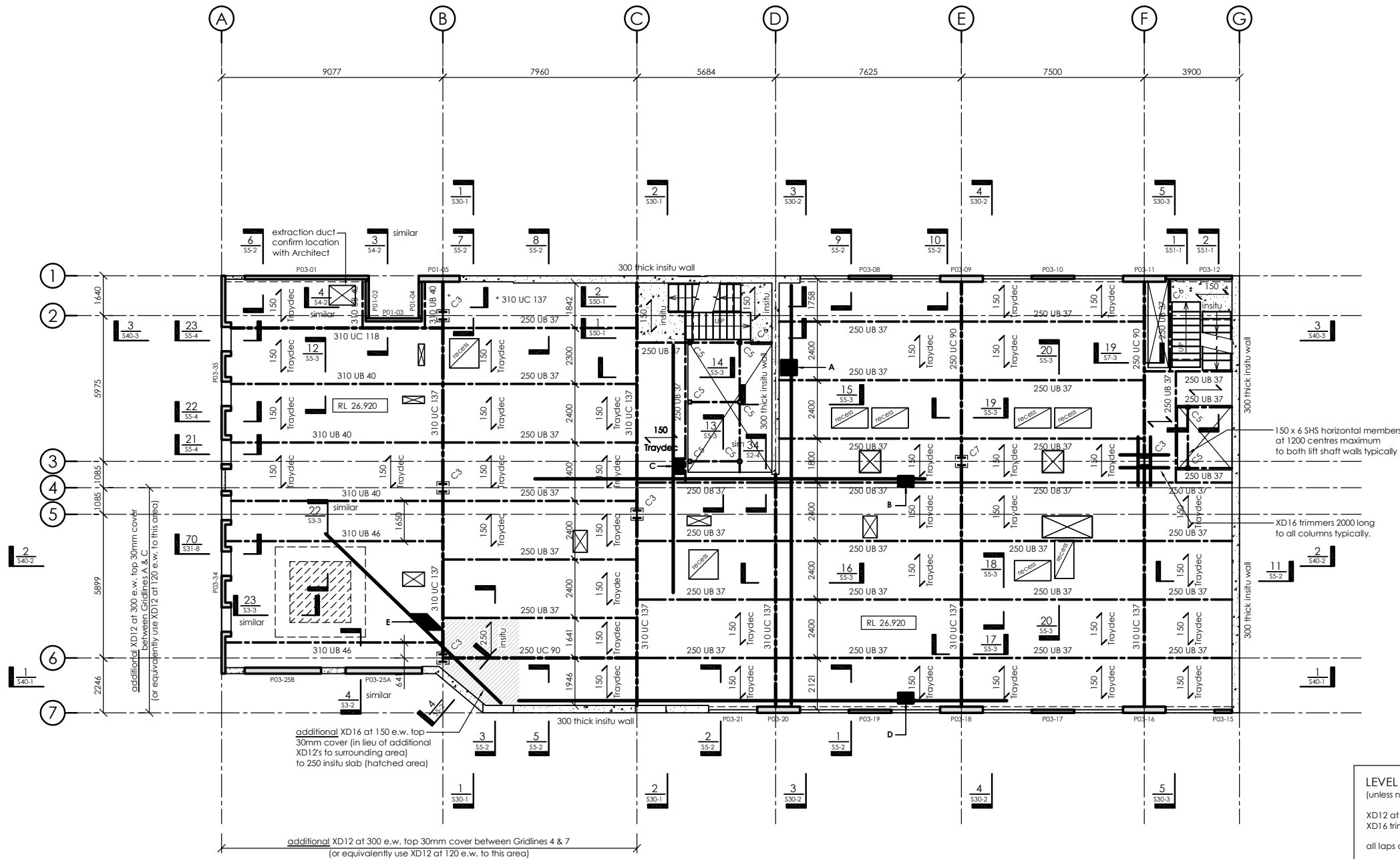
WARNERS NOVOTEL  
CHRISTCHURCH

DRAWING TITLE:

LEVEL 3 FLOOR PLAN

DRAWN: GPW	SCALE: 1:100 @ A1 1:200 @ A3	REV. A
ENGINEER: AJW		
CHECKED: CBL		
FILE: 106019	DRAWING NO. S5-1	

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LEVEL 3 FLOOR PLAN  
1:100

LEVEL 3 TOPPING REINFORCING  
(unless noted otherwise)

XD12 at 300 e.w. 30mm top cover  
XD16 trimmers to all edges and openings

all laps of topping bars to be staggered

all bars terminating at face of wall to have standard returns unless lapped with wall starters

concrete strength = 30MPa  
for entire Level 3 slab

note: Traydec units typically to have 70mm seating on steel beams and 20mm side seating to steel beams

PROPPING

In general Traydec slab (using continuous or double span sheets) does not require propping. Primary UC beams to be propped typically. 310 UC beams to be cambered 20mm upwards typically. Secondary UB beams to be propped at quarter points and cambered 15mm upwards typically. Secondary UC beams to be propped and cambered 10mm upwards typically.

recess 25mm slab recess for showers typically.  
refer Architect's drawings

LEVEL 3 DRAG BARS

- A 7-XD20 at 60 central full width
- B 5-XD16 at 60 central 16000 long central on lift void opening note: bars run under A & C drag bars
- C 5-XD20 at 60 central 10000 long
- D 5-XD20 at 60 central 20000 long
- E 9-XD25 at 60 central 10000 long all bars to terminate at wall Gridline 7

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CONTRACTOR TO VERIFY ALL DIMENSIONS ON SITE REFER TO ARCHITECT'S DRAWING FOR ALL SETOUTS

NOTES :

Refer notes sheet at the start of drawing set for notes typically

Refer Architects drawings for all set out dimensions, opening sizes, slab set downs, rebates, insitu nibs, upstands, sealants etc.

All discrepancies shall be referred to the Architect for resolution before proceeding with work.

Typically all insitu concrete wall elements to be 30 MPa concrete unless noted otherwise.

Typically all precast concrete and precast beams to be 35 MPa concrete unless noted otherwise.

All insitu interfaces and construction joints shall be thoroughly roughened to 5mm amplitude.

All precast to insitu interfaces and grouted joints shall be thoroughly roughened to 5mm amplitude.

All insitu walls to have XD starters  
All precast panels to have D starters  
All starters shall lap for full lap length beyond outermost drag bar where applicable

Floor topping bars running parallel to numerical gridlines shall have 30mm top cover (i.e. top bars - refer details)

Confirm all lift dimensions with lift manufacturers before commencing construction. Also confirm location of lift pit sumps.

All primary load bearing steelwork (including columns, beams, etc.) will require specific fire rating. Refer to Fire Engineer and/or Architect for requirements, details, and fire rating options.

Provide 200 nom. Nelson shear studs 100 long to all steel beams u.n.o.  
welded in accordance with AS 1554 Part 2.  
at 150 centres for all primary UC beams  
at 200 centres for all secondary UB beams

Traydec units to typically have 70mm seating onto steel beams/angles/walls and 20mm side seating

All slab openings shall be trimmed with XD16 bars to all edges extend 600mm past opening u.n.o.

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1	31/05/07	CONSENT ISSUE	GPW
REV.	DATE	AMENDMENT	BY

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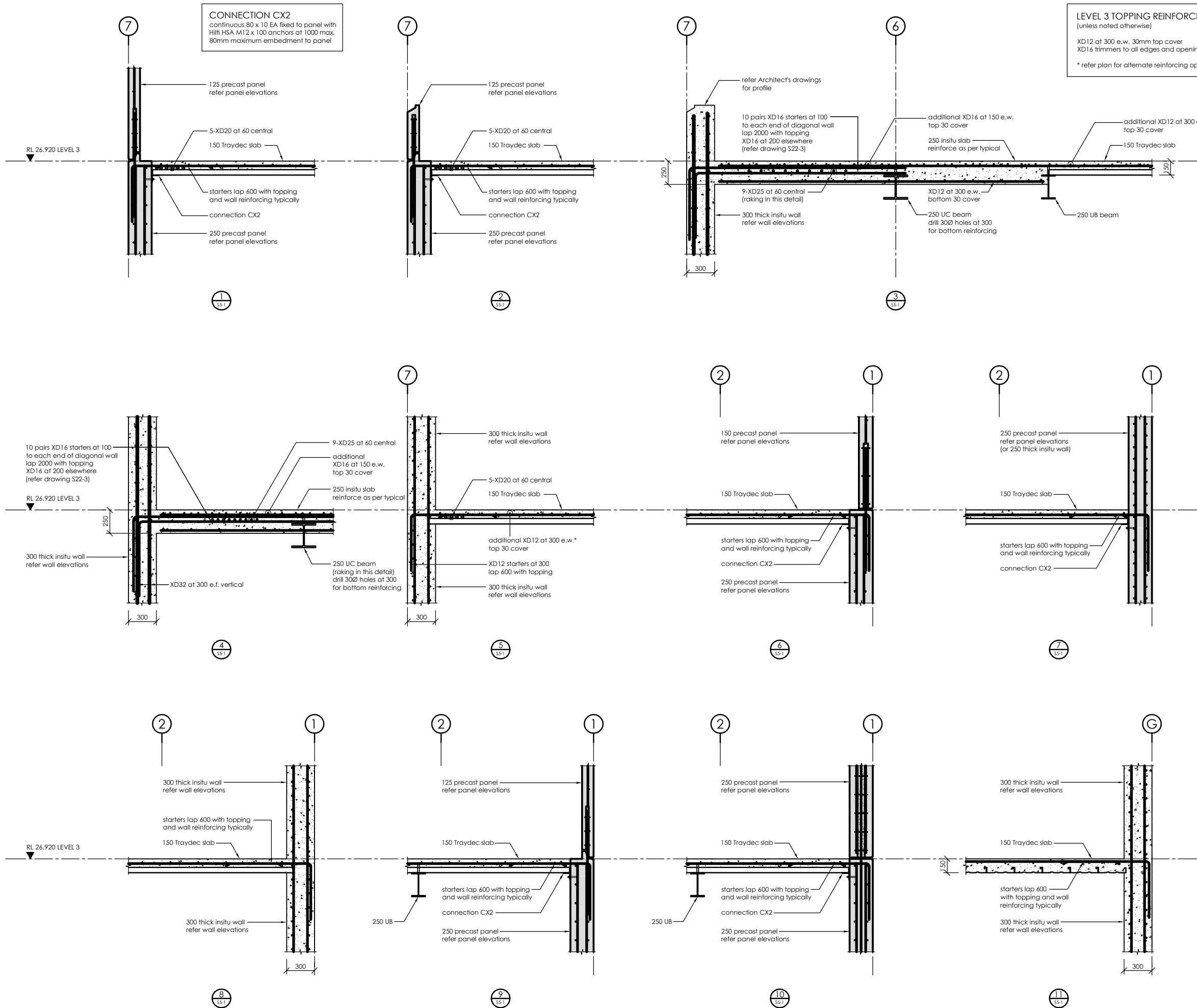
WARNERS NOVOTEL  
CHRISTCHURCH

DRAWING TITLE:

LEVEL 3 DETAILS  
SHEET 1 OF 3

DRAWN:	GPW	SCALE:	1:20 @ A1
ENGINEER:	AJW		1:40 @ A3
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FILE:	106019	DRAWING NO.	S5-2
		REV.	A

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All slab openings shall be trimmed with XD16 bars to all edges extend 600mm past opening u.n.o.

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1	31/05/07	CONSENT ISSUE	GPW
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DRAWING TITLE:

LEVEL 3 DETAILS  
SHEET 2 OF 3

DRAWN: GPW	SCALE: 1:20 @ A1 1:40 @ A3	
ENGINEER: AJW		
CHECKED: CBL		
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Typically all precast concrete and precast beams to be 35 MPa concrete unless noted otherwise.

All insitu interfaces and construction joints shall be thoroughly roughened to 5mm amplitude.

All precast to insitu interfaces and grouted joints shall be thoroughly roughened to 5mm amplitude.

All insitu walls to have XD starters  
All precast panels to have D starters  
All starters shall lap for full lap length beyond outermost drag bar where applicable

Floor topping bars running parallel to numerical gridlines shall have 30mm top cover (i.e. top bars - refer details)

Confirm all lift dimensions with lift manufacturers before commencing construction. Also confirm location of lift pit sumps.

All primary load bearing steelwork (including columns, beams, etc.) will require specific fire rating. Refer to Fire Engineer and/or Architect for requirements, details, and fire rating options.

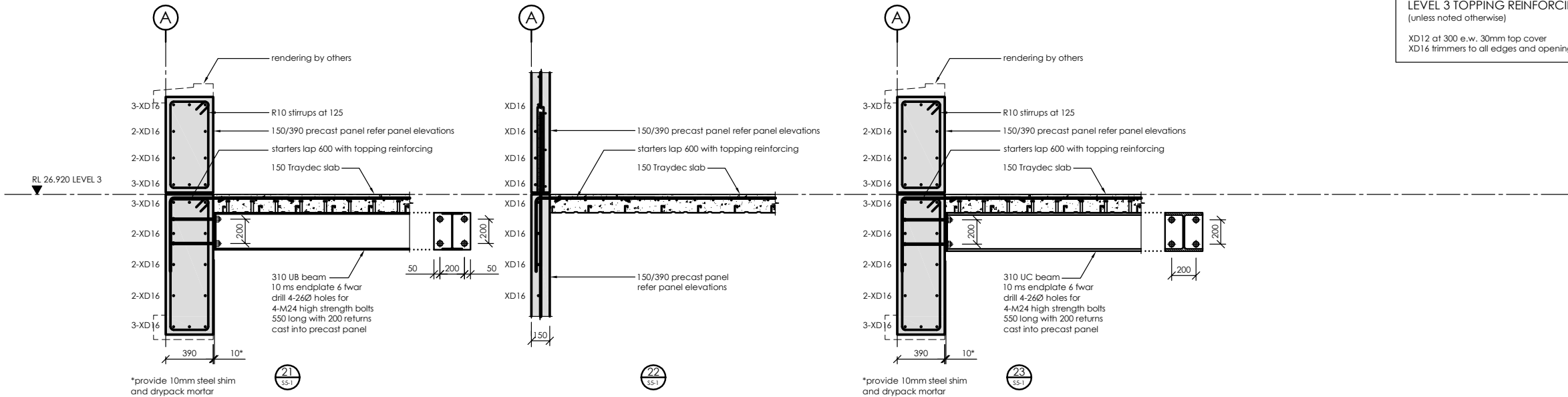
Provide 200 nom. Nelson shear studs 100 long to all steel beams u.n.o.  
welded in accordance with AS 1554 Part 2.  
at 150 centres for all primary UC beams  
at 200 centres for all secondary UB beams

Traydec units to typically have 70mm seating onto steel beams/angles/walls and 20mm side seating

All slab openings shall be trimmed with XD16 bars to all edges extend 600mm past opening u.n.o.

LEVEL 3 TOPPING REINFORCING  
(unless noted otherwise)

XD12 at 300 e.w. 30mm top cover  
XD16 trimmers to all edges and openings



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CHRISTCHURCH

DRAWING TITLE:

LEVEL 3 DETAILS  
SHEET 3 OF 3

DRAWN: GPW	SCALE:	
ENGINEER: AJW	1:20 @ A1	
CHECKED: CBL	1:40 @ A3	
FILE: 106019	DRAWING NO. S5-4	REV. A

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All precast to insitu interfaces and grouted joints shall be thoroughly roughened to 5mm amplitude.

All insitu walls to have XD starters  
All precast panels to have D starters  
All starters shall lap for full lap length beyond outermost drag bar where applicable

Floor topping bars running parallel to numerical gridlines shall have 30mm top cover (i.e. top bars - refer details)

Confirm all lift dimensions with lift manufacturers before commencing construction. Also confirm location of lift pit sumps.

All primary load bearing steelwork (including columns, beams, etc.) will require specific fire rating. Refer to Fire Engineer and/or Architect for requirements, details, and fire rating options.

Provide 200 nom. Nelson shear studs 100 long to all steel beams u.n.o.  
welded in accordance with AS 1554 Part 2.  
at 150 centres for all primary UC beams  
at 200 centres for all secondary UB beams

Traydec units to typically have 70mm seating onto steel beams/angles/walls and 20mm side seating

All slab openings shall be trimmed with XD16 bars to all edges extend 600mm past opening u.n.o.

REV.	DATE	AMENDMENT	BY
A	22/01/08	CONSTRUCTION ISSUE	GPW
4	31/05/07	CONSENT ISSUE	GPW
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1	21/12/06	FOR CLIENT REVIEW	GPW

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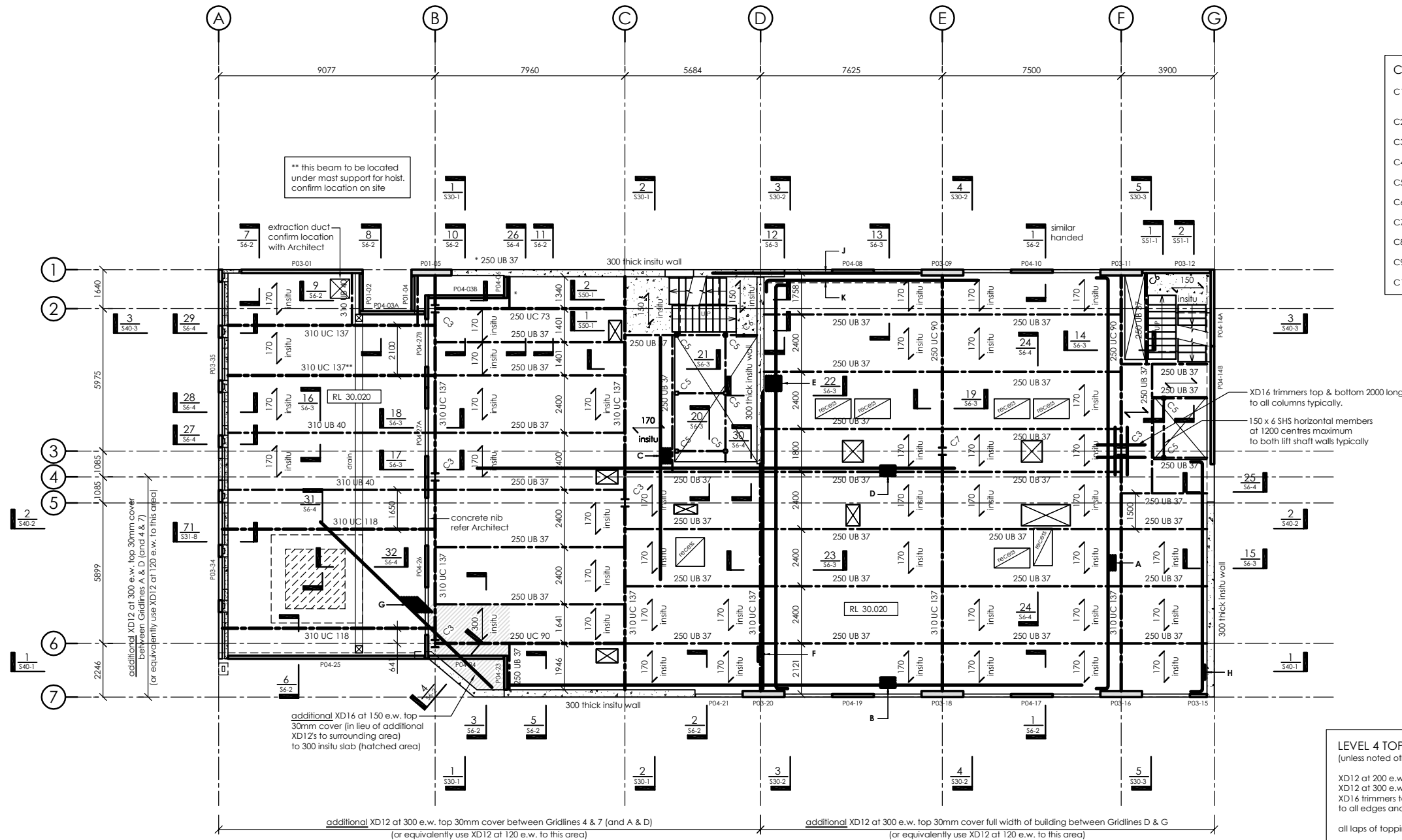
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CHRISTCHURCH**

DRAWING TITLE:

**LEVEL 4 FLOOR PLAN**

DRAWN: GPW	SCALE: 1:100 @ A1 1:200 @ A3	REV. A
ENGINEER: AJW		
CHECKED: CBL		
FILE: 106019	DRAWING NO. S6-1	

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#### LEVEL 4 FLOOR PLAN

1:100

beam layout applies from Level 4 to Level 13

#### LEVEL 4 DRAG BARS

- A** 4-XD32 at 75 central full width with standard returns
- B** 5-XD20 at 60 top & bottom 24000 long
- C** 5-XD20 at 60 central 10000 long
- D** 5-XD20 at 60 top & bottom 20000 long central on lift void opening  
note: bars run under **C** & **E** drag bars
- E** 7-XD32 at 75 central  
3-XD32 to have standard returns
- F** 2-XD32 top & bottom approx. 12500 long lap 3000 into insitu wall Gridline D
- G** 8-XD32 at 75 central 10000 long all bars to terminate at wall Gridline 7
- H** 2-XD32 at 75 central full width (as shown) with standard returns
- J** 4-XD32 central to wall Gridline 1 lap 3000 with wall reinforcing
- K** 4-XD32 standard returns to one end top bar to lap 1500 past Gridline E

#### LEVEL 4 TOPPING REINFORCING (unless noted otherwise)

XD12 at 200 e.w. top 30mm cover  
XD12 at 300 e.w. bottom 30mm cover  
XD16 trimmers top and bottom to all edges and openings

all laps of topping bars to be staggered

all bars terminating at face of wall to have standard returns unless lapped with wall starters

**concrete strength = 35MPa  
for entire Level 4 slab**

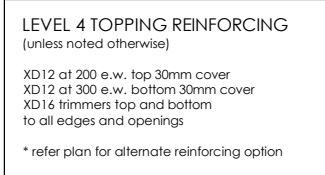
note: Traydec units typically to have 70mm seating on steel beams and 20mm side seating to steel beams

#### PROPPING

In general Traydec slab (using continuous or double span sheets) does not require propping. Primary UC beams to be propped typically. 310 UC beams to be cambered 20mm upwards typically. Secondary UB beams to be propped at quarter points and cambered 15mm upwards typically. Secondary UC beams to be propped and cambered 10mm upwards typically.

recess 25mm slab recess for showers typically. refer Architect's drawings





NOTES :

Refer notes sheet at the start of drawing set for notes typically

All discrepancies shall be referred to the Architect for resolution before proceeding with work.

Typically all insitu concrete wall elements to be 30 MPa concrete unless noted otherwise.

Typically all precast concrete and precast beams to be 35 MPa concrete unless noted otherwise.

All insitu interfaces and construction joints shall be thoroughly roughened to 5mm amplitude.

All precast to insitu interfaces and grouted joints shall be thoroughly roughened to 5mm amplitude.

All insitu walls to have XD starters  
All precast panels to have D starters  
All starters shall lap for full lap length beyond  
outermost drag bar where applicable

Floor topping bars running parallel to numerical gridlines shall have 30mm top cover (i.e. top bars - refer details)

Confirm all lift dimensions with lift manufacturers before commencing construction. Also confirm location of lift pit sumps.

All primary load bearing steelwork (including columns, beams, etc.) will require specific fire rating. Refer to Fire Engineer and/or Architect for requirements, details, and fire rating options.

Provide 200 nom. Nelson shear studs 100 long  
to all steel beams u.n.o.  
welded in accordance with AS 1554 Part 2.  
at 150 centres for all primary UC beams  
at 200 centres for all secondary UB beams

Traydec units to typically have  
70mm seating onto steel beams/angles/walls  
and 20mm side seating

All slab openings shall be trimmed with XD16 bars to all edges extend 600mm past opening u.n.o.

A	22/01/08	CONSTRUCTION ISSUE	GPW
1	31/05/07	CONSENT ISSUE	GPW
REV.	DATE	AMENDMENT	BY

ARCHITECT:



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CONSULTING ENGINEERS

PROJECT:

WARNERS NOVOTEL  
CHRISTCHURCH

DRAWING TITLE:

LEVEL 4 DETAILS  
SHEET 1 OF 3

DRAWN: GPW	SCALE: 1:20 @ A1 1:40 @ A3	
ENGINEER: AJW		
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FILE: 106019	DRAWING NO. S6-2	REV. A

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All insitu interfaces and construction joints shall be thoroughly roughened to 5mm amplitude.

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All insitu walls to have XD starters  
All precast panels to have D starters  
All starters shall lap for full lap length beyond outermost drag bar where applicable

Floor topping bars running parallel to numerical gridlines shall have 30mm top cover (i.e. top bars - refer details)

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Provide 200 nom. Nelson shear studs 100 long to all steel beams u.n.o.  
welded in accordance with AS 1554 Part 2.  
at 150 centres for all primary UC beams  
at 200 centres for all secondary UB beams

Traydec units to typically have 70mm seating onto steel beams/angles/walls and 20mm side seating

All slab openings shall be trimmed with XD16 bars to all edges extend 600mm past opening u.n.o.

REV.	DATE	AMENDMENT	BY
A	22/01/08	CONSTRUCTION ISSUE	GPW
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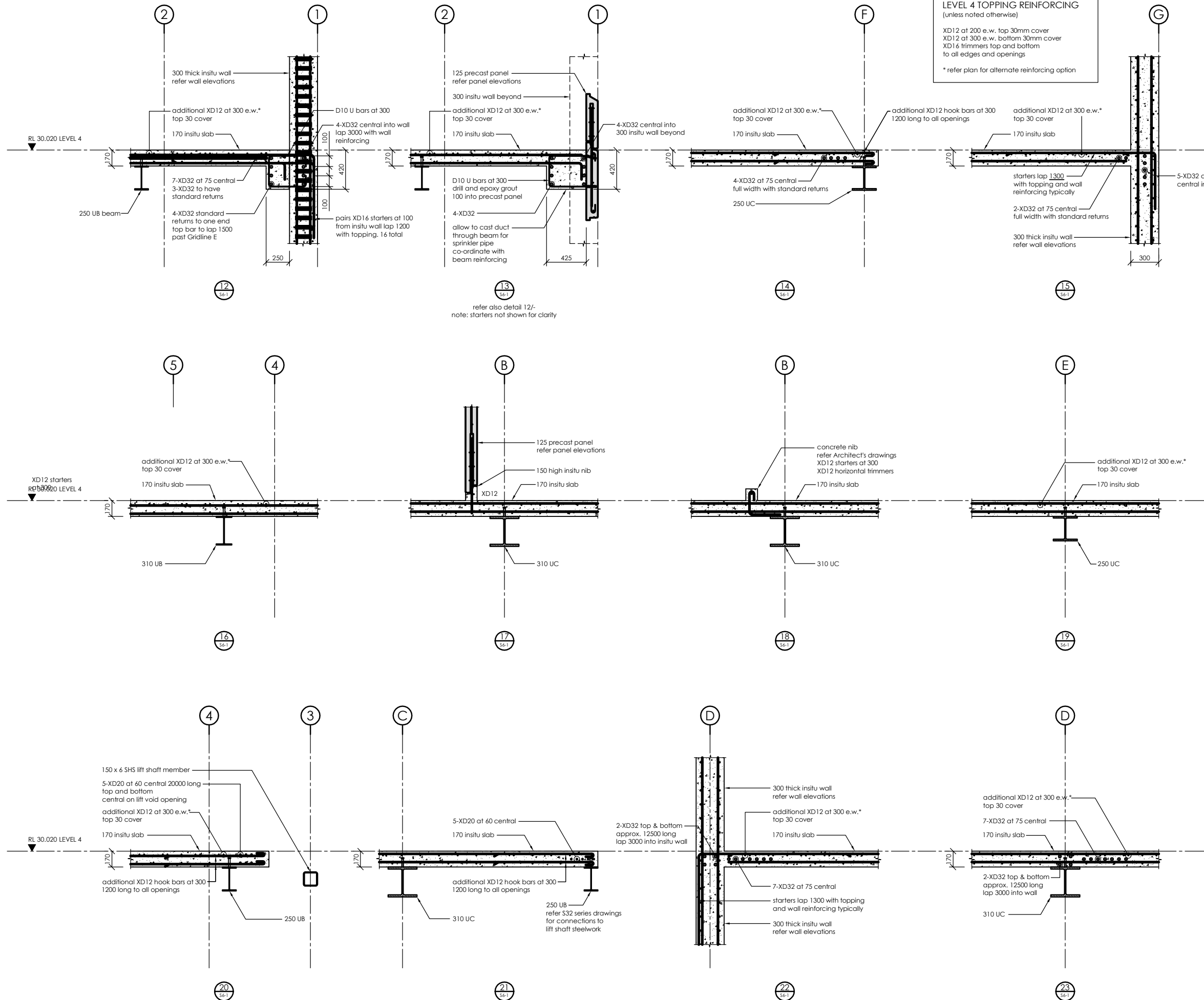
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DRAWING TITLE:

LEVEL 4 DETAILS  
SHEET 2 OF 3

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All starters shall lap for full lap length beyond outermost drag bar where applicable

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Traydec units to typically have 70mm seating onto steel beams/angles/walls and 20mm side seating

All slab openings shall be trimmed with XD16 bars to all edges extend 600mm past opening u.n.o.

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A	22/01/08	CONSTRUCTION ISSUE	GPW
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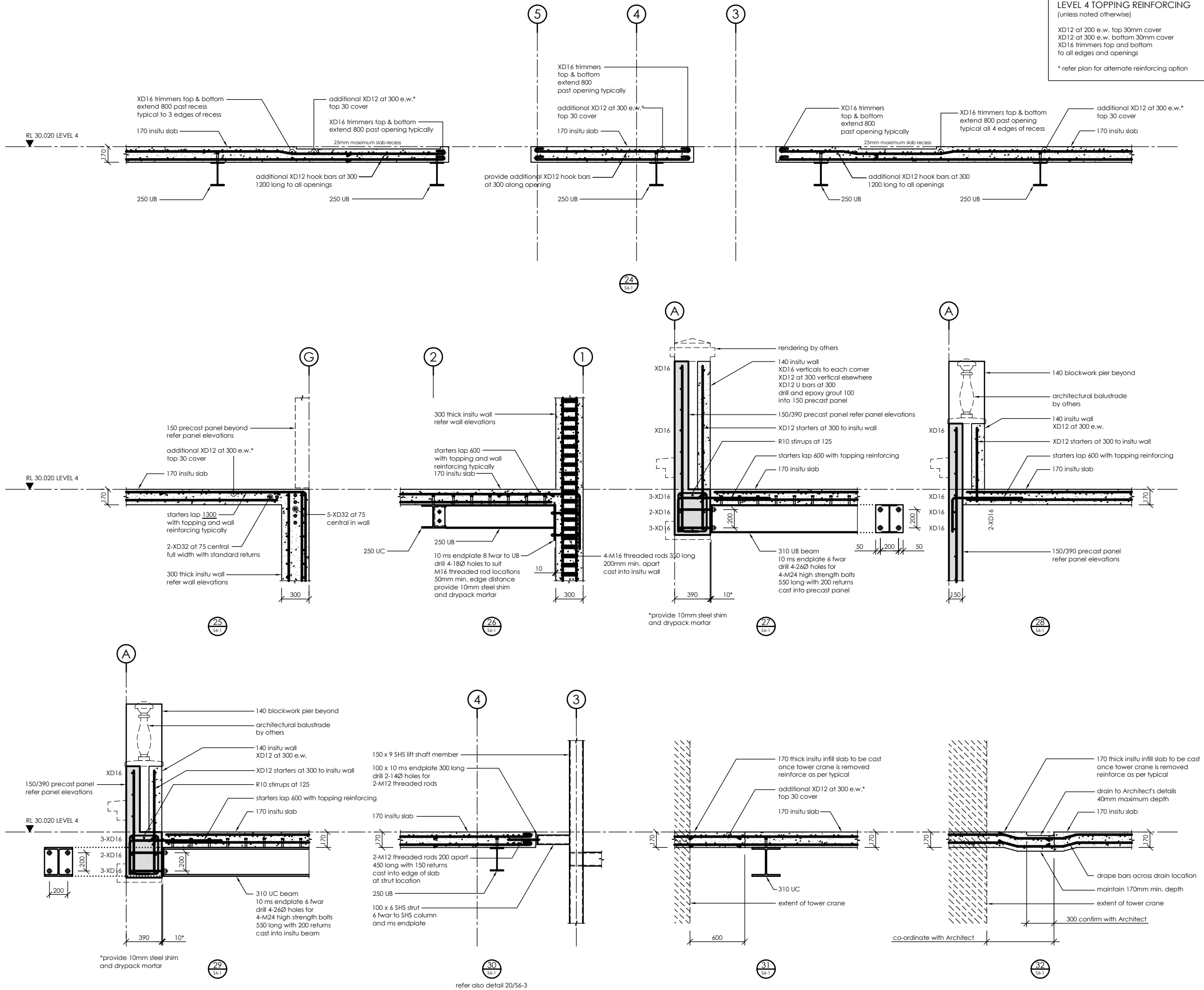
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DRAWING TITLE:

LEVEL 4 DETAILS  
SHEET 3 OF 3

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All insitu walls to have XD starters  
All precast panels to have D starters  
All starters shall lap for full lap length beyond outermost drag bar where applicable

Floor topping bars running parallel to numerical gridlines shall have 30mm top cover (i.e. top bars - refer details)

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A	22/01/08	CONSTRUCTION ISSUE	GPW
4	31/05/07	CONSENT ISSUE	GPW
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1	21/12/06	FOR CLIENT REVIEW	GPW

ARCHITECT:



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CONSULTING ENGINEERS

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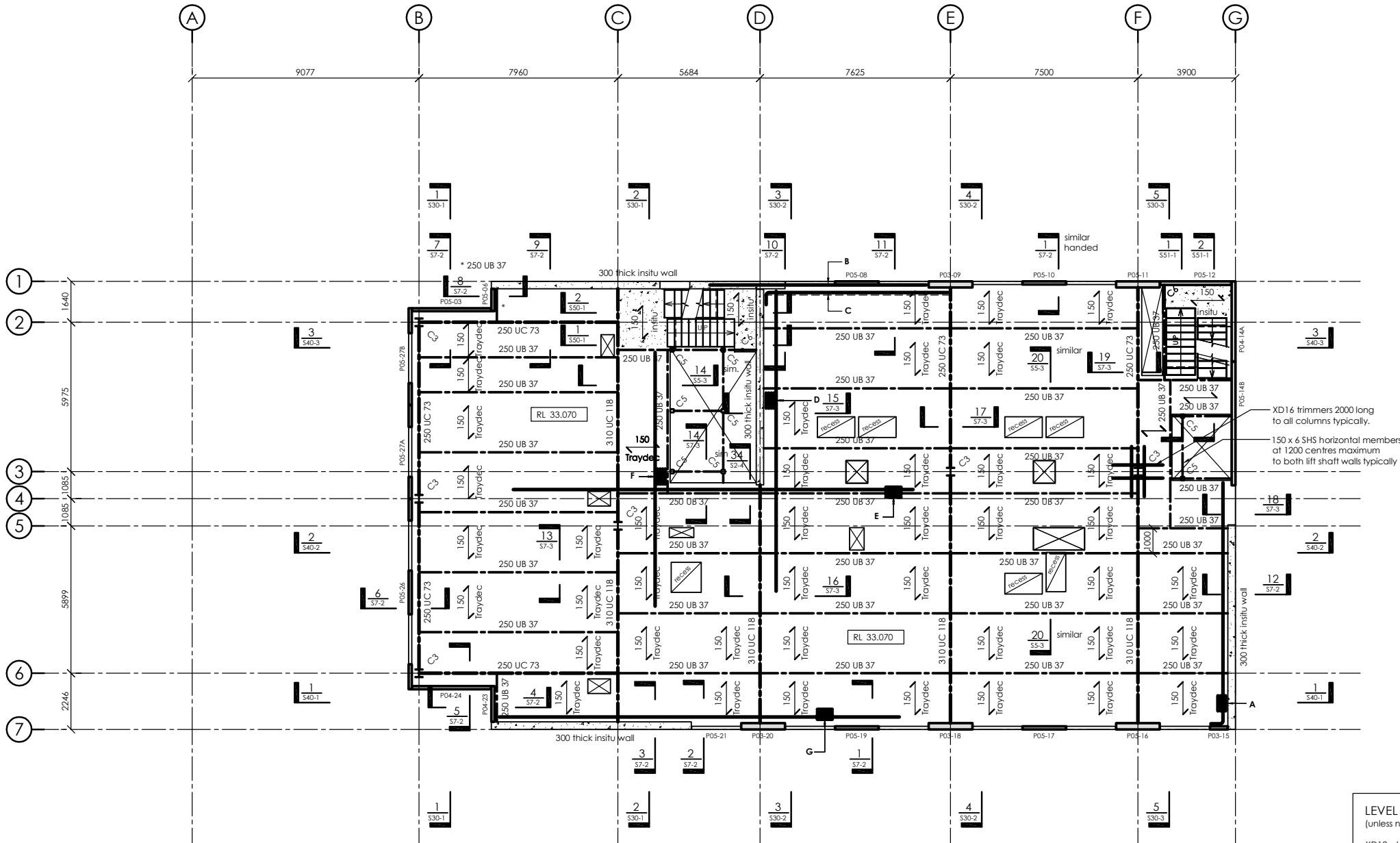
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CHRISTCHURCH

DRAWING TITLE:

LEVEL 5 FLOOR PLAN

DRAWN: GPW	SCALE:	
ENGINEER: AJW	1:100 @ A1	
CHECKED: GPW	1:200 @ A3	
FILE: 106019	DRAWING NO. S7-1	REV. A

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LEVEL 5 FLOOR PLAN  
1:100

LEVEL 5 DRAG BARS

- A 4-XD20 at 60 central full width (as shown) with standard returns to one end
- B 4-XD25 central to wall Gridline 1 lap 3000 with wall reinforcing
- C 4-XD25 standard returns to one end
- D 5-XD20 at 60 central 12000 long
- E 5-XD20 at 60 central 16000 long central on lift void opening note: bars run under D & F drag bars
- F 5-XD20 at 60 central 10000 long
- G 5-XD20 at 60 central 16000 long

PROPPING

In general Traydec slab (using continuous or double span sheets) does not require propping. Primary UC beams to be propped typically. 310 UC beams to be cambered 20mm upwards typically. Secondary UB beams to be propped at quarter points and cambered 15mm upwards typically. Secondary UC beams to be propped and cambered 10mm upwards typically.

recess 25mm slab recess for showers typically. refer Architect's drawings

LEVEL 5 TOPPING REINFORCING  
(unless noted otherwise)

XD12 at 300 e.w. 30mm top cover  
XD16 trimmers to all edges and openings  
  
all laps of topping bars to be staggered  
  
all bars terminating at face of wall to have standard returns unless lapped with wall starters  
  
concrete strength = 25MPa  
  
note: Traydec units typically to have 70mm seating on steel beams and 20mm side seating to steel beams

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All starters shall lap for full lap length beyond outermost drag bar where applicable

Floor topping bars running parallel to numerical gridlines shall have 30mm top cover (i.e. top bars - refer details)

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at 150 centres for all primary UC beams  
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All slab openings shall be trimmed with XD16 bars to all edges extend 600mm past opening u.n.o.

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ARCHITECT:



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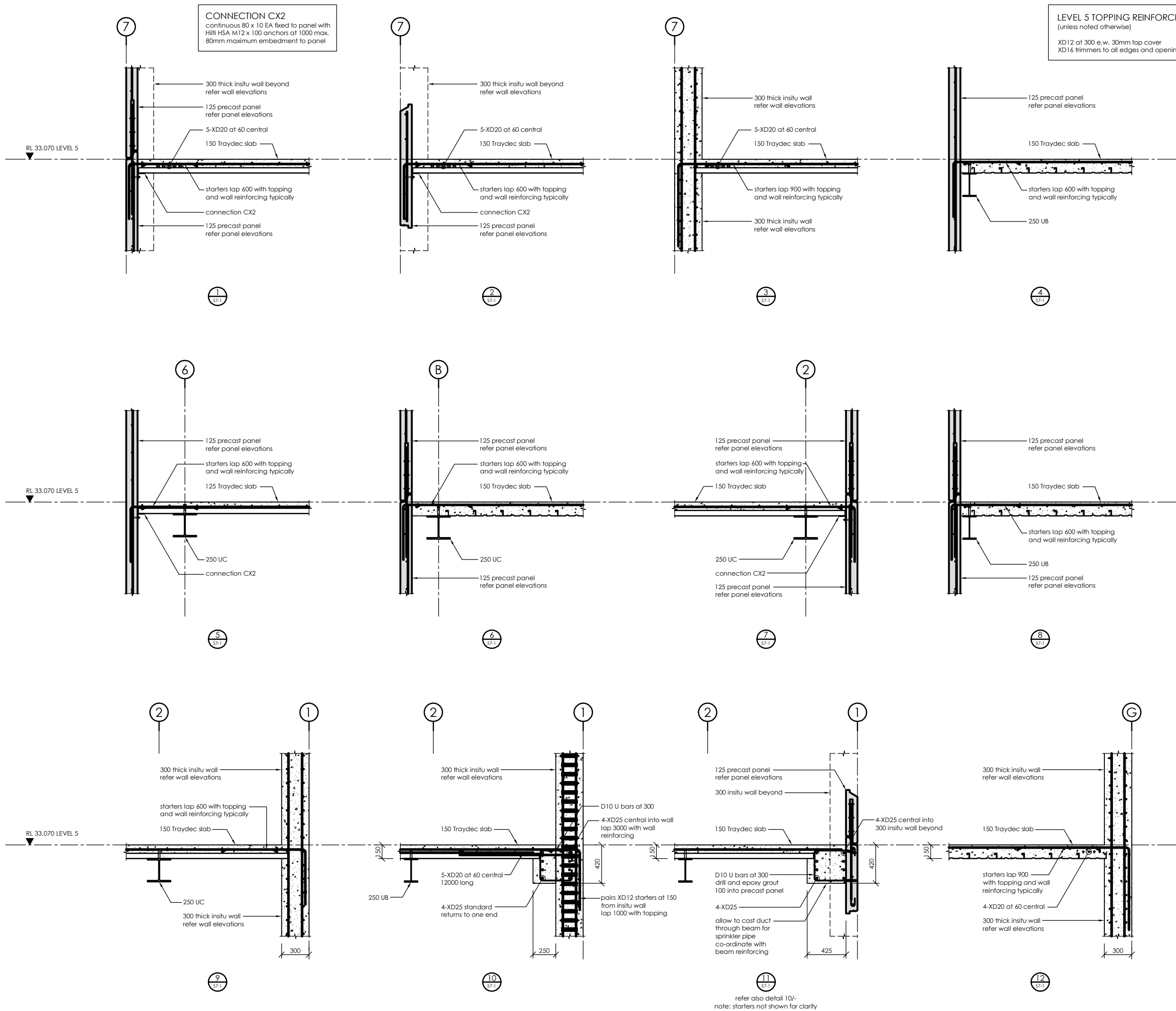
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DRAWING TITLE:

LEVEL 5 DETAILS  
SHEET 1 OF 2

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FILE: 106019	DRAWING NO. S7-2	REV. A

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CONTRACTOR TO VERIFY ALL DIMENSIONS ON SITE  
REFER TO ARCHITECT'S DRAWING FOR ALL SETOUTS

NOTES :

Refer notes sheet at the start of drawing set for notes typically

Refer Architects drawings for all set out dimensions, opening sizes, slab set downs, rebates, insitu nibs, upstands, sealants etc.

All discrepancies shall be referred to the Architect for resolution before proceeding with work.

Typically all insitu concrete wall elements to be 30 MPa concrete unless noted otherwise.

Typically all precast concrete and precast beams to be 35 MPa concrete unless noted otherwise.

All insitu interfaces and construction joints shall be thoroughly roughened to 5mm amplitude.

All precast to insitu interfaces and grouted joints shall be thoroughly roughened to 5mm amplitude.

All insitu walls to have XD starters  
All precast panels to have D starters  
All starters shall lap for full lap length beyond outermost drag bar where applicable

Floor topping bars running parallel to numerical gridlines shall have 30mm top cover (i.e. top bars - refer details)

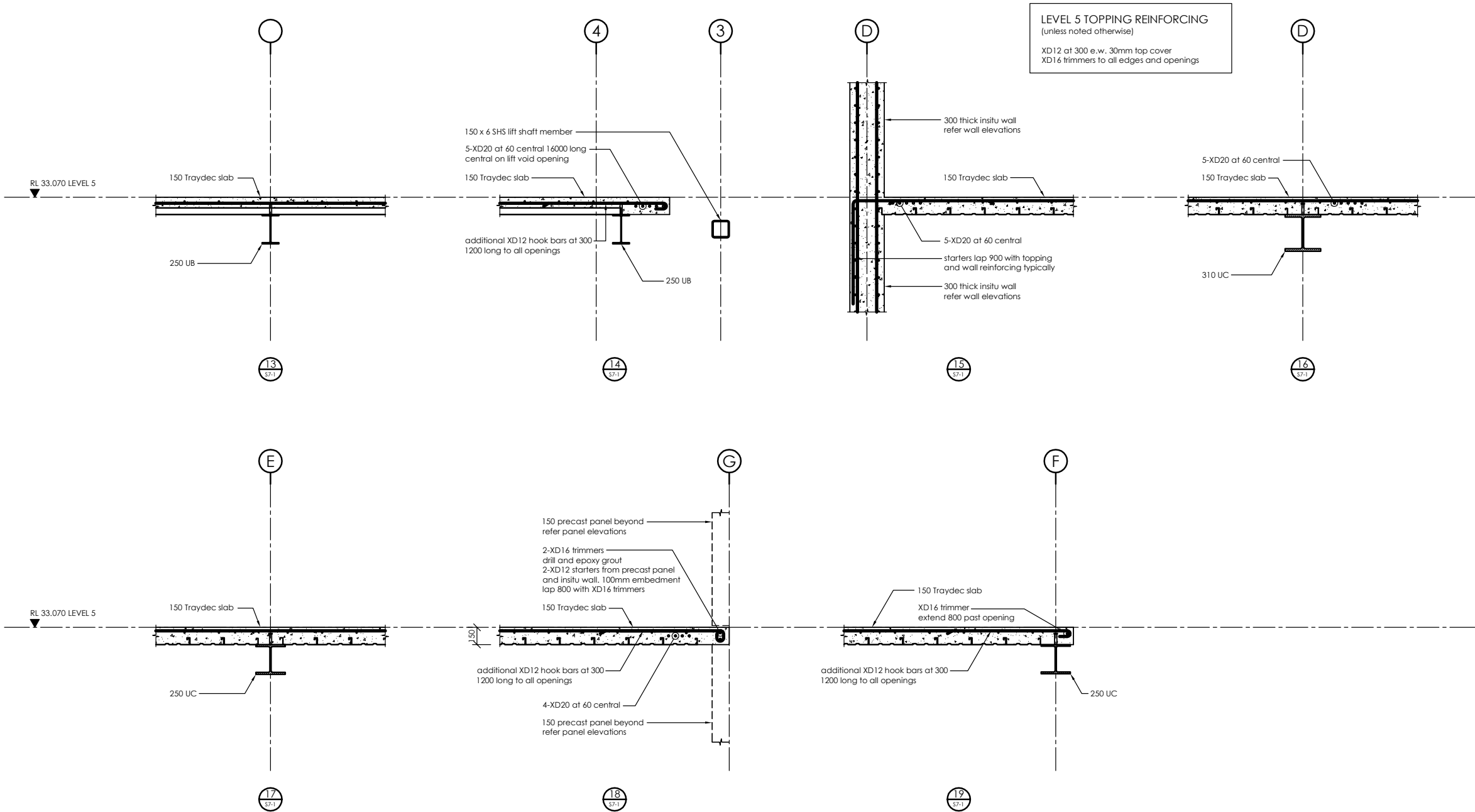
Confirm all lift dimensions with lift manufacturers before commencing construction. Also confirm location of lift pit sumps.

All primary load bearing steelwork (including columns, beams, etc.) will require specific fire rating. Refer to Fire Engineer and/or Architect for requirements, details, and fire rating options.

Provide 200 nom. Nelson shear studs 100 long to all steel beams u.n.o.  
welded in accordance with AS 1554 Part 2.  
at 150 centres for all primary UC beams  
at 200 centres for all secondary UB beams

Traydec units to typically have 70mm seating onto steel beams/angles/walls and 20mm side seating

All slab openings shall be trimmed with XD16 bars to all edges extend 600mm past opening u.n.o.



A	22/01/08	CONSTRUCTION ISSUE	GPW
I	31/05/07	CONSENT ISSUE	GPW
REV.	DATE	AMENDMENT	BY

ARCHITECT:



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PROJECT:

WARNERS NOVOTEL  
CHRISTCHURCH

DRAWING TITLE:

LEVEL 5 DETAILS  
SHEET 2 OF 2

DRAWN: GPW	SCALE:	
ENGINEER: AJW	1:20 @ A1	
CHECKED: CBL	1:40 @ A3	
FILE: 106019	DRAWING NO. S7-3	REV. A



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All precast panels to have D starters  
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A	22/01/08	CONSTRUCTION ISSUE	GPW
4	31/05/07	CONSENT ISSUE	GPW
3	22/03/07	TENDER UPDATE ISSUE	GPW
2	31/01/07	TENDER ISSUE	GPW
1	21/12/06	FOR CLIENT REVIEW	GPW

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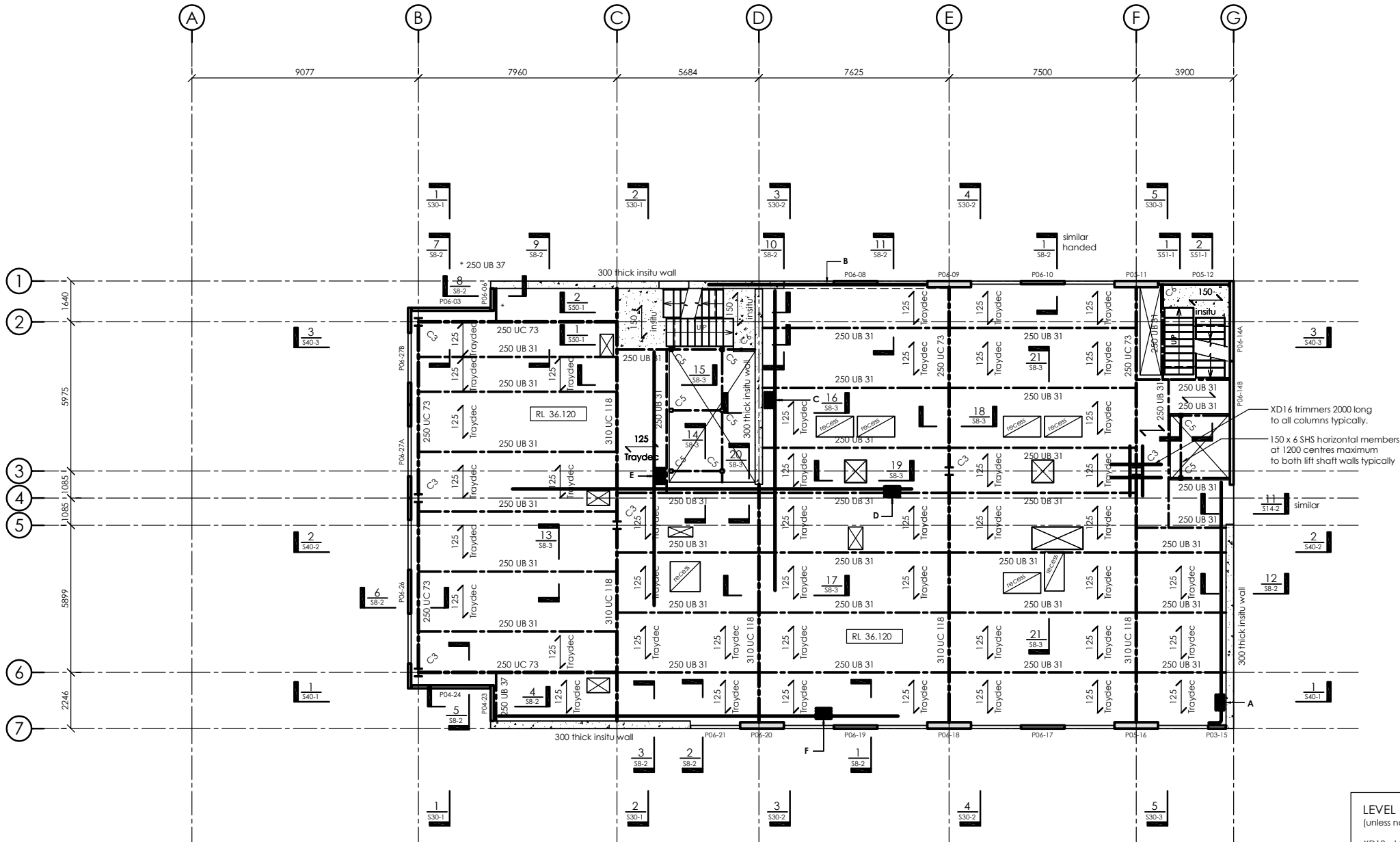
WARNERS NOVOTEL  
CHRISTCHURCH

DRAWING TITLE:

LEVEL 6 FLOOR PLAN

DRAWN: GPW	SCALE: 1:100 @ A1 1:200 @ A3	REV. A
ENGINEER: AJW		
CHECKED: CBL		
FILE: 106019	DRAWING NO. S8-1	

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LEVEL 6 FLOOR PLAN  
1:100

LEVEL 6 TOPPING REINFORCING  
(unless noted otherwise)

XD12 at 300 e.w. 30mm top cover  
XD16 trimmers to all edges and openings

all laps of topping bars to be staggered

all bars terminating at face of wall to have standard returns unless lapped with wall starters

concrete strength = 25MPa

note: Traydec units typically to have 70mm seating on steel beams and 20mm side seating to steel beams

PROPPING

In general Traydec slab (using continuous or double span sheets) does not require propping. Primary UC beams to be propped typically. 310 UC beams to be cambered 20mm upwards typically. Secondary UB beams to be propped at quarter points and cambered 15mm upwards typically. Secondary UC beams to be propped and cambered 10mm upwards typically.

recess 25mm slab recess for showers typically. refer Architect's drawings

LEVEL 6 DRAG BARS

- A 4-XD16 at 60 central full width (as shown) with standard returns to one end
- B 4-XD20 central to wall Gridline 1 lap 3000 with wall reinforcing
- C 5-XD16 at 60 central 12000 long
- D 5-XD16 at 60 central 16000 long central on lift void opening note: bars run under C & E drag bars
- E 5-XD16 at 60 central 10000 long
- F 5-XD16 at 60 central 16000 long

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All precast to insitu interfaces and grouted joints shall be thoroughly roughened to 5mm amplitude.

All insitu walls to have XD starters  
All precast panels to have D starters  
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ARCHITECT:



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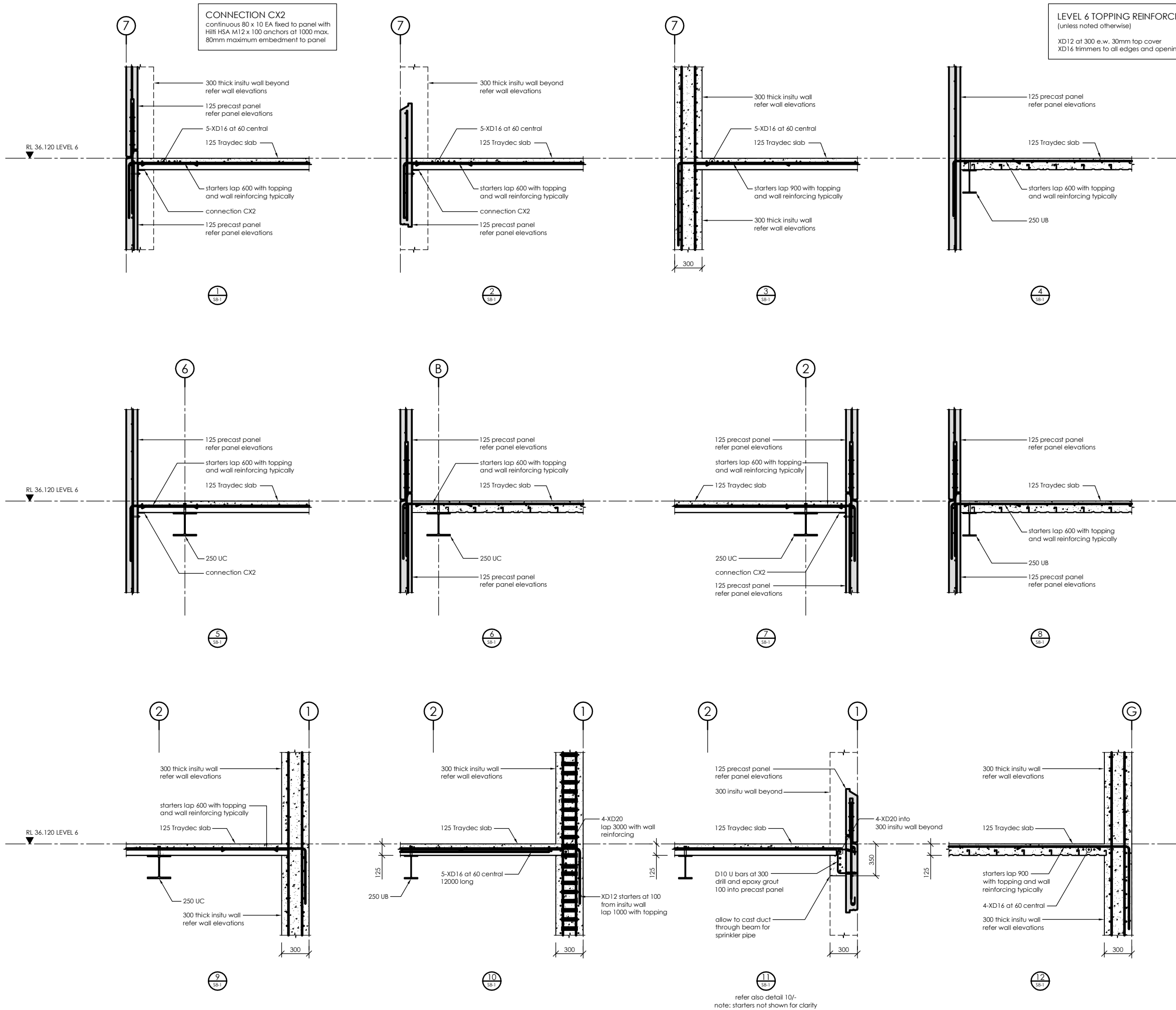
WARNERS NOVOTEL  
CHRISTCHURCH

DRAWING TITLE:

LEVEL 6 DETAILS  
SHEET 1 OF 2

DRAWN:	GPW	SCALE:	1:20 @ A1
ENGINEER:	AJW		1:40 @ A3
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FILE:	106019	DRAWING NO.	S8-2
		REV.	A

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CONNECTION CX2  
continuous 80 x 10 EA fixed to panel with  
Hilti HSA M12 x 100 anchors at 1000 max.  
80mm maximum embedment to panel

LEVEL 6 TOPPING REINFORCING  
(unless noted otherwise)  
XD12 at 300 e.w. 30mm top cover  
XD16 trimmers to all edges and openings

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REV.	DATE	AMENDMENT	BY

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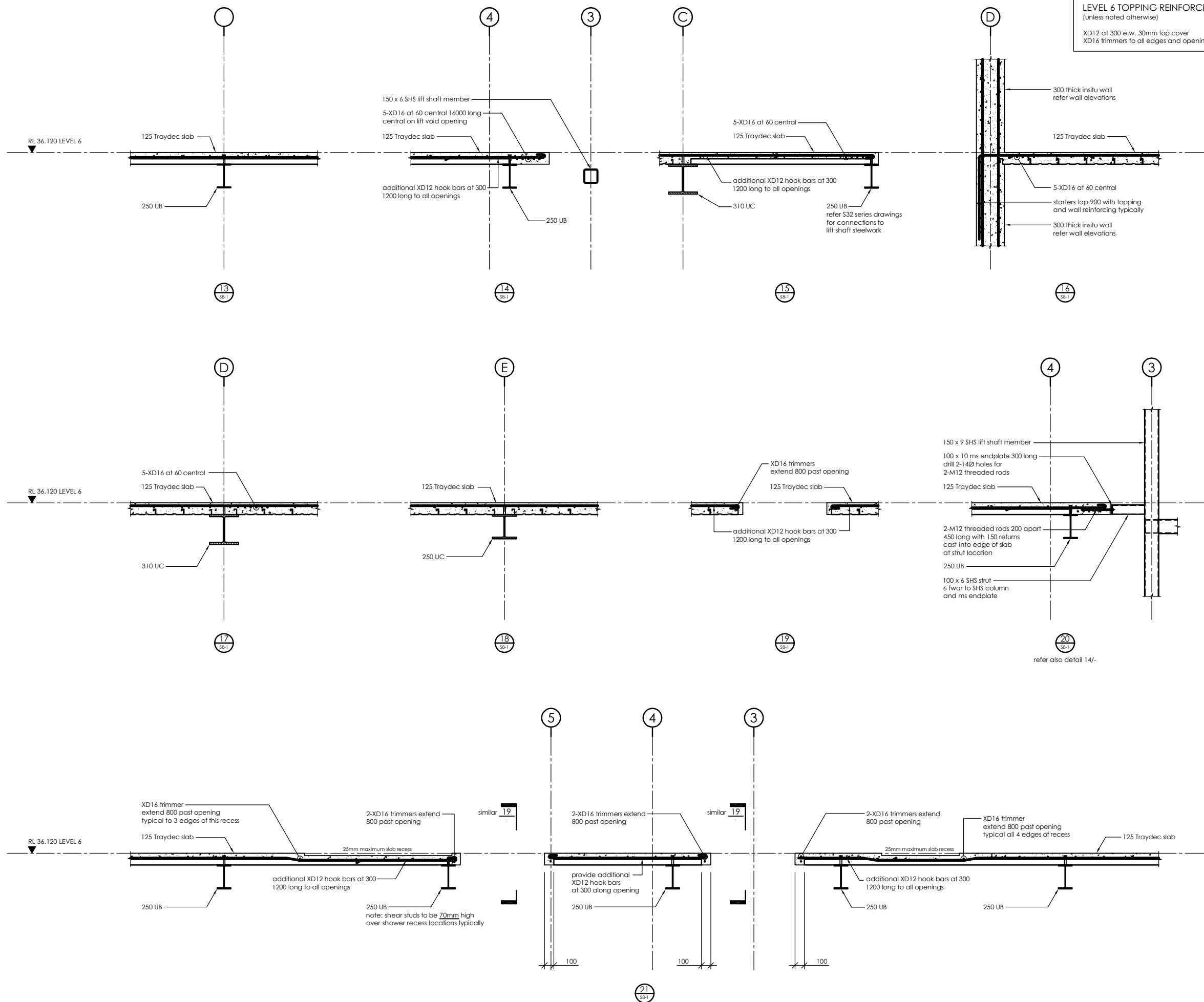
PROJECT:

WARNERS NOVOTEL  
CHRISTCHURCH

DRAWING TITLE:

LEVEL 6 DETAILS  
SHEET 2 OF 2

DRAWN: <b>GPW</b>	SCALE:  1:20 @ A1  1:40 @ A3	
ENGINEER: <b>AJW</b>		
CHECKED: <b>CBL</b>		
FILE: <b>106019</b>	DRAWING NO. <b>S8-3</b>	REV. <b>A</b>





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ARCHITECT:



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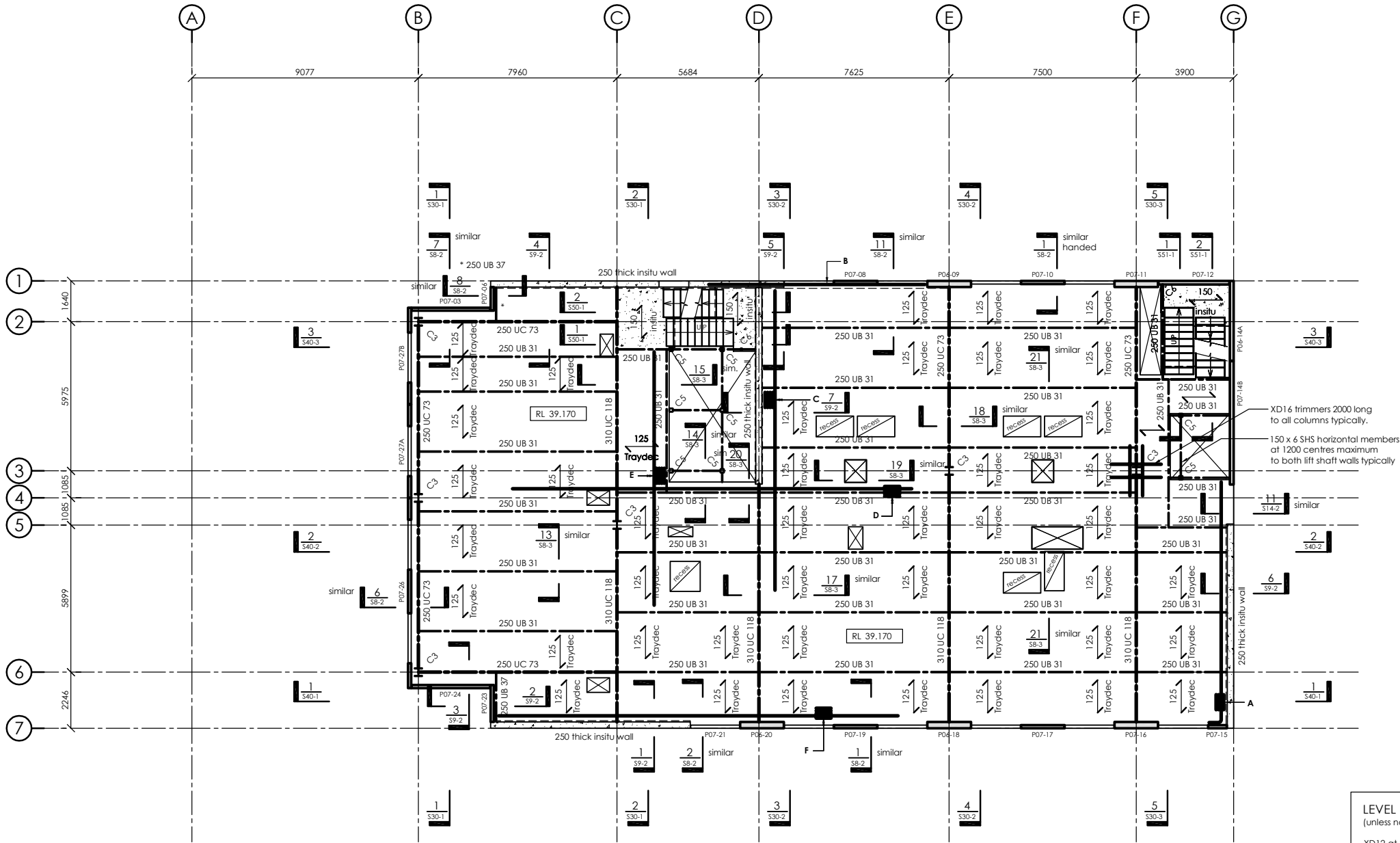
WARNERS NOVOTEL  
CHRISTCHURCH

DRAWING TITLE:

LEVEL 7 FLOOR PLAN

DRAWN: GPW	SCALE:	
ENGINEER: AJW	1:100 @ A1	
CHECKED: CBL	1:200 @ A3	
FILE: 106019	DRAWING NO. S9-1	REV. A

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LEVEL 7 FLOOR PLAN  
1:100

LEVEL 7 TOPPING REINFORCING  
(unless noted otherwise)

XD12 at 300 e.w. 30mm top cover  
XD16 trimmers to all edges and openings

all laps of topping bars to be staggered

all bars terminating at face of wall to have standard returns unless lapped with wall starters

concrete strength = 25MPa

note: Traydec units typically to have 70mm seating on steel beams and 20mm side seating to steel beams

PROPPING

In general Traydec slab (using continuous or double span sheets) does not require propping. Primary UC beams to be propped typically. 310 UC beams to be cambered 20mm upwards typically. Secondary UB beams to be propped at quarter points and cambered 15mm upwards typically. Secondary UC beams to be propped and cambered 10mm upwards typically.

recess 25mm slab recess for showers typically. refer Architect's drawings

LEVEL 7 DRAG BARS

- A 4-XD16 at 60 central full width (as shown) with standard returns to one end
- B 4-XD20 central to wall Gridline 1 lap 3000 with wall reinforcing
- C 5-XD16 at 60 central 12000 long
- D 5-XD16 at 60 central 16000 long central on lift void opening note: bars run under C & E drag bars
- E 5-XD16 at 60 central 10000 long
- F 5-XD16 at 60 central 16000 long

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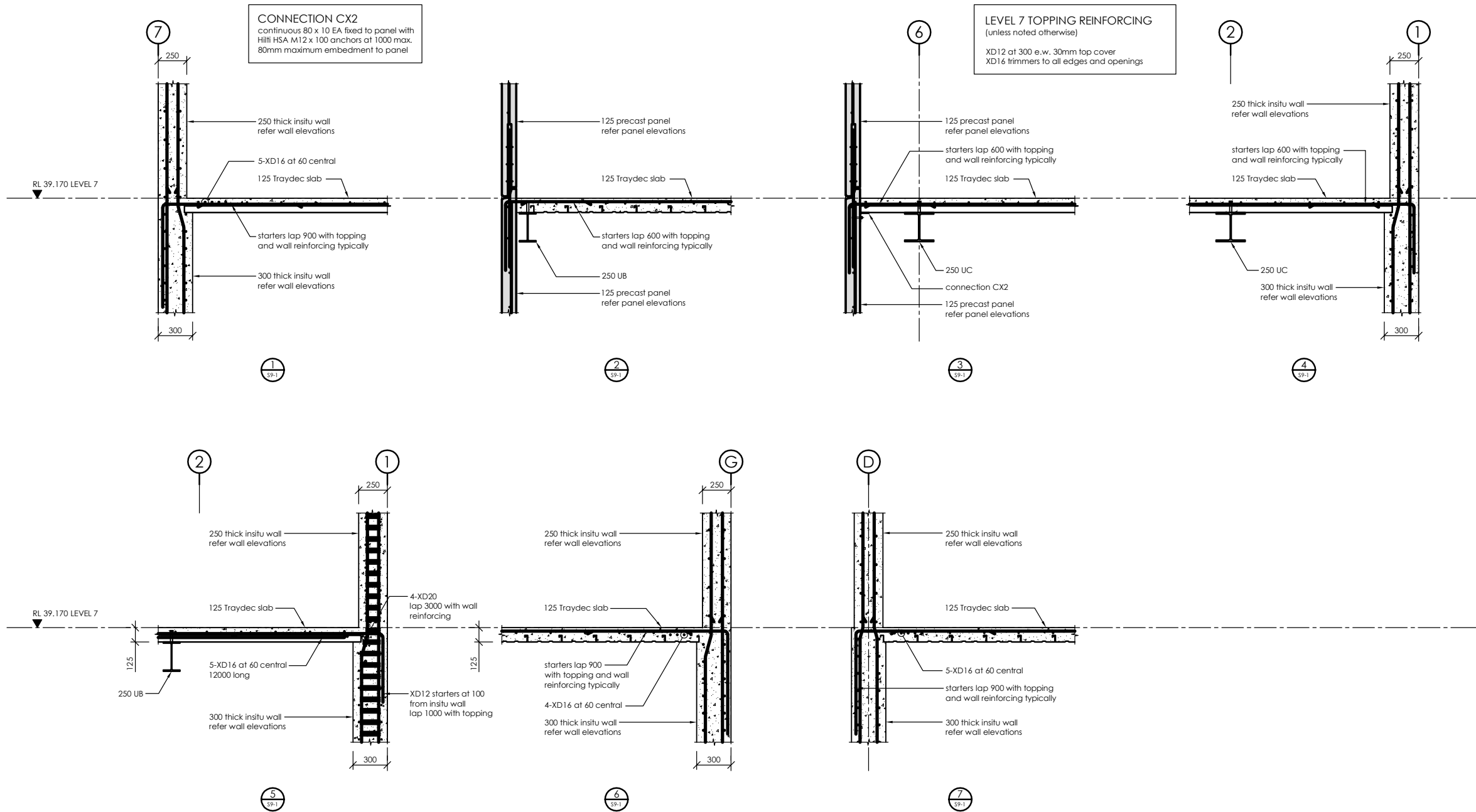
WARNERS NOVOTEL  
CHRISTCHURCH

DRAWING TITLE:

LEVEL 7 DETAILS  
SHEET 1 OF 1

DRAWN: GPW	SCALE: 1:20 @ A1 1:40 @ A3	
ENGINEER: AJW		
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FILE: 106019	DRAWING NO. S9-2	REV. A

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A	22/01/08	CONSTRUCTION ISSUE	GPW
4	31/05/07	CONSENT ISSUE	GPW
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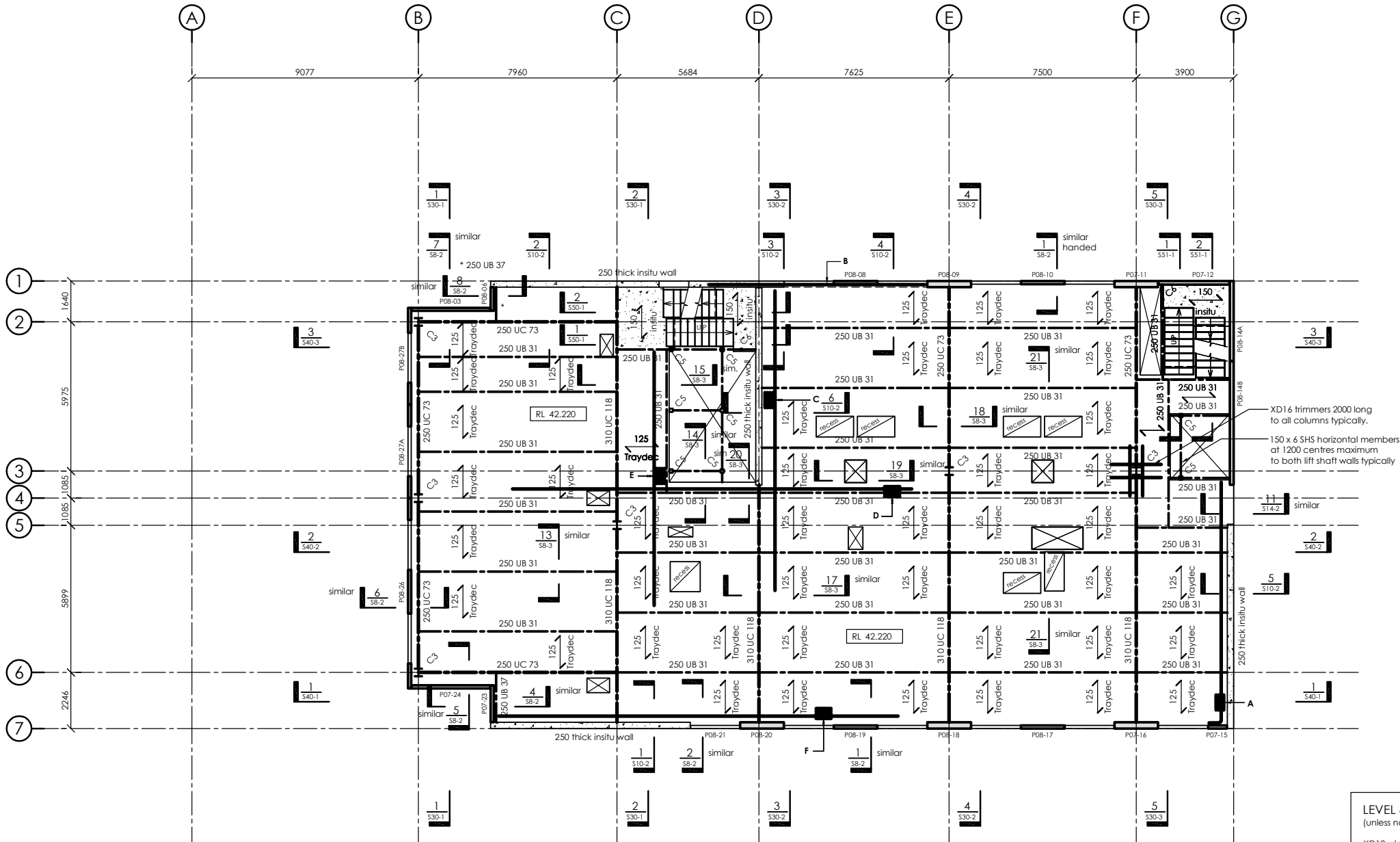
WARNERS NOVOTEL  
CHRISTCHURCH

DRAWING TITLE:

LEVEL 8 FLOOR PLAN

DRAWN: GPW	SCALE: 1:100 @ A1 1:200 @ A3	REV. A
ENGINEER: AJW		
CHECKED: GPW		
FILE: 106019	DRAWING NO. S10-1	

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LEVEL 8 FLOOR PLAN  
1:100

LEVEL 8 TOPPING REINFORCING  
(unless noted otherwise)

XD12 at 300 e.w. 30mm top cover  
XD16 trimmers to all edges and openings

all laps of topping bars to be staggered

all bars terminating at face of wall to have standard returns unless lapped with wall starters

concrete strength = 25MPa

note: Traydec units typically to have 70mm seating on steel beams and 20mm side seating to steel beams

PROPPING

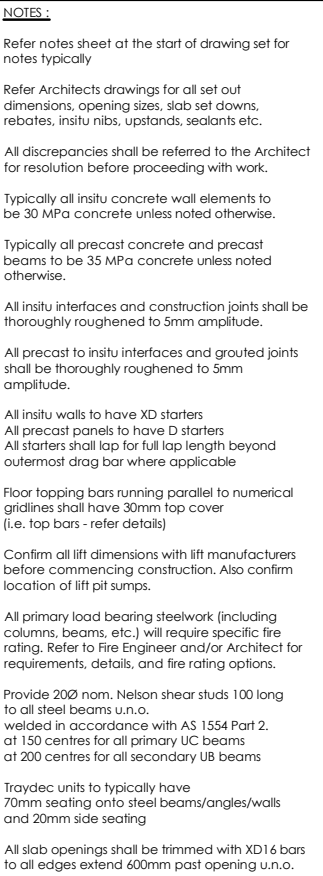
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recess 25mm slab recess for showers typically. refer Architect's drawings

LEVEL 8 DRAG BARS

- A 4-XD16 at 60 central full width (as shown) with standard returns to one end
- B 4-XD20 central to wall Gridline 1 lap 3000 with wall reinforcing
- C 5-XD16 at 60 central 12000 long
- D 5-XD16 at 60 central 16000 long central on lift void opening note: bars run under C & E drag bars
- E 5-XD16 at 60 central 10000 long
- F 5-XD16 at 60 central 16000 long





A	22/01/08	CONSTRUCTION ISSUE	GPW
1	31/05/07	CONSENT ISSUE	GPW
REV.	DATE	AMENDMENT	BY

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PROJECT:

WARNERS NOVOTEL  
CHRISTCHURCH

DRAWING TITLE:

LEVEL 8 DETAILS  
SHEET 1 OF 1

DRAWN: GPW	SCALE: 1:20 @ A1 1:40 @ A3	
ENGINEER: AJW		
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FILE: 106019	DRAWING NO. S10-2	REV. A

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ARCHITECT:



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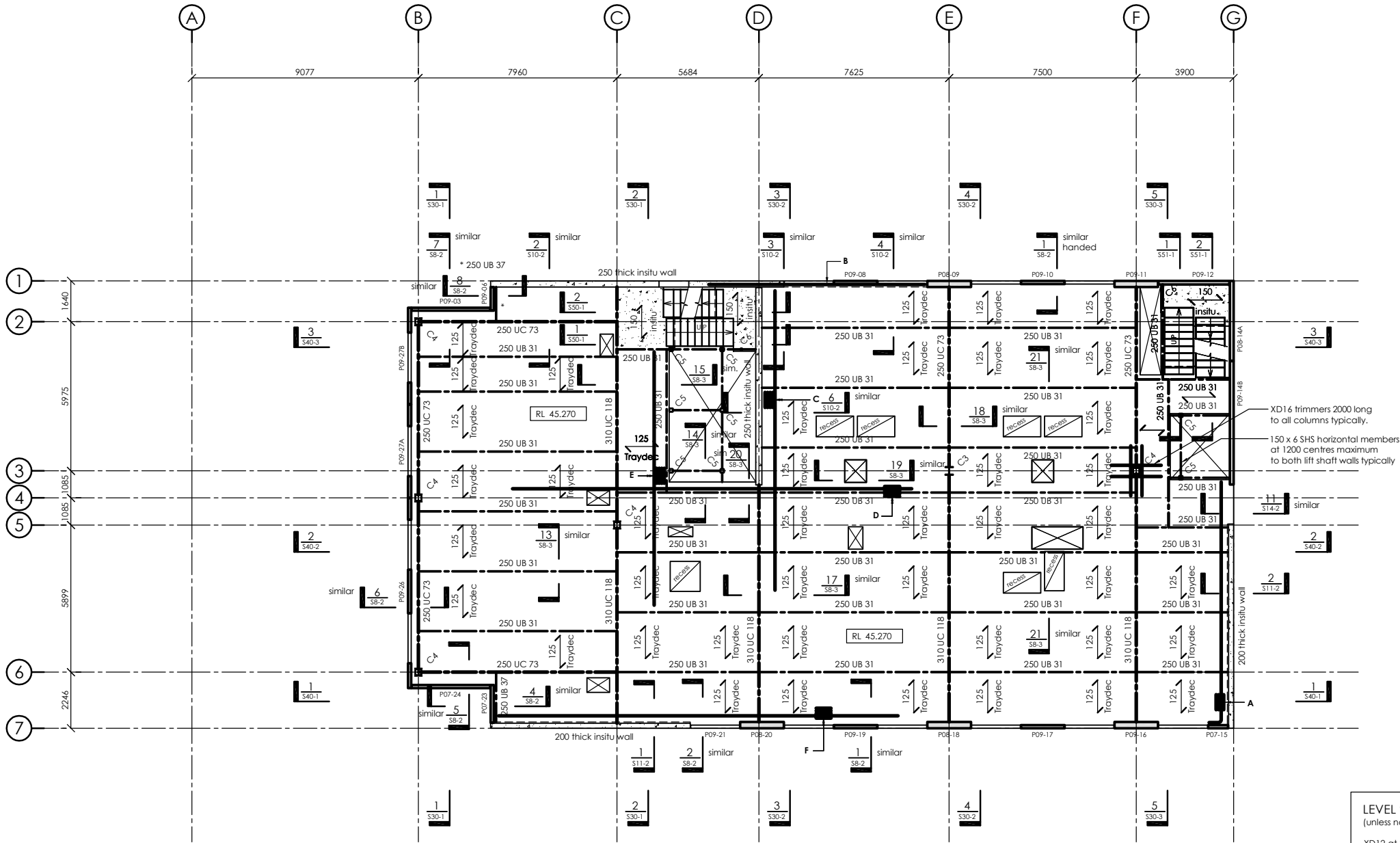
WARNERS NOVOTEL  
CHRISTCHURCH

DRAWING TITLE:

LEVEL 9 FLOOR PLAN

DRAWN: GPW	SCALE:	
ENGINEER: AJW	1:100 @ A1	
CHECKED: CBL	1:200 @ A3	
FILE: 106019	DRAWING NO. S11-1	REV. A

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LEVEL 9 FLOOR PLAN  
1:100

LEVEL 9 TOPPING REINFORCING  
(unless noted otherwise)

XD12 at 300 e.w. 30mm top cover  
XD16 trimmers to all edges and openings

all laps of topping bars to be staggered

all bars terminating at face of wall to have standard returns unless lapped with wall starters

concrete strength = 25MPa

note: Traydec units typically to have 70mm seating on steel beams and 20mm side seating to steel beams

PROPPING

In general Traydec slab (using continuous or double span sheets) does not require propping. Primary UC beams to be propped typically. 310 UC beams to be cambered 20mm upwards typically. Secondary UB beams to be propped at quarter points and cambered 15mm upwards typically. Secondary UC beams to be propped and cambered 10mm upwards typically.

recess 25mm slab recess for showers typically. refer Architect's drawings

LEVEL 9 DRAG BARS

- A 4-XD16 at 60 central full width (as shown) with standard returns to one end
- B 4-XD20 central to wall Gridline 1 lap 3000 with wall reinforcing
- C 5-XD16 at 60 central 12000 long
- D 5-XD16 at 60 central 16000 long central on lift void opening note: bars run under C & E drag bars
- E 5-XD16 at 60 central 10000 long
- F 5-XD16 at 60 central 16000 long

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CONTRACTOR TO VERIFY ALL DIMENSIONS ON SITE  
REFER TO ARCHITECT'S DRAWING FOR ALL SETOUTS

NOTES :

Refer notes sheet at the start of drawing set for notes typically

Refer Architects drawings for all set out dimensions, opening sizes, slab set downs, rebates, insitu nibs, upstands, sealants etc.

All discrepancies shall be referred to the Architect for resolution before proceeding with work.

Typically all insitu concrete wall elements to be 30 MPa concrete unless noted otherwise.

Typically all precast concrete and precast beams to be 35 MPa concrete unless noted otherwise.

All insitu interfaces and construction joints shall be thoroughly roughened to 5mm amplitude.

All precast to insitu interfaces and grouted joints shall be thoroughly roughened to 5mm amplitude.

All insitu walls to have XD starters  
All precast panels to have D starters  
All starters shall lap for full lap length beyond outermost drag bar where applicable

Floor topping bars running parallel to numerical gridlines shall have 30mm top cover (i.e. top bars - refer details)

Confirm all lift dimensions with lift manufacturers before commencing construction. Also confirm location of lift pit sumps.

All primary load bearing steelwork (including columns, beams, etc.) will require specific fire rating. Refer to Fire Engineer and/or Architect for requirements, details, and fire rating options.

Provide 200 nom. Nelson shear studs 100 long to all steel beams u.n.o.  
welded in accordance with AS 1554 Part 2.  
at 150 centres for all primary UC beams  
at 200 centres for all secondary UB beams

Traydec units to typically have 70mm seating onto steel beams/angles/walls and 20mm side seating

All slab openings shall be trimmed with XD16 bars to all edges extend 600mm past opening u.n.o.

A	22/01/08	CONSTRUCTION ISSUE	GPW
1	31/05/07	CONSENT ISSUE	GPW
REV.	DATE	AMENDMENT	BY

ARCHITECT:



lewis bradford  
CONSULTING ENGINEERS

PROJECT:

WARNERS NOVOTEL  
CHRISTCHURCH

DRAWING TITLE:

LEVEL 9-12 DETAILS  
SHEET 1 OF 1

DRAWN: GPW	SCALE:	
ENGINEER: AJW	1:20 @ A1	
CHECKED: CBL	1:40 @ A3	
FILE: 106019	DRAWING NO. S11-2	REV. A

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LEVEL 9 TOPPING REINFORCING  
(unless noted otherwise)

XD12 at 300 e.w. 30mm top cover  
XD16 trimmers to all edges and openings

LEVEL 10 TOPPING REINFORCING  
(unless noted otherwise)

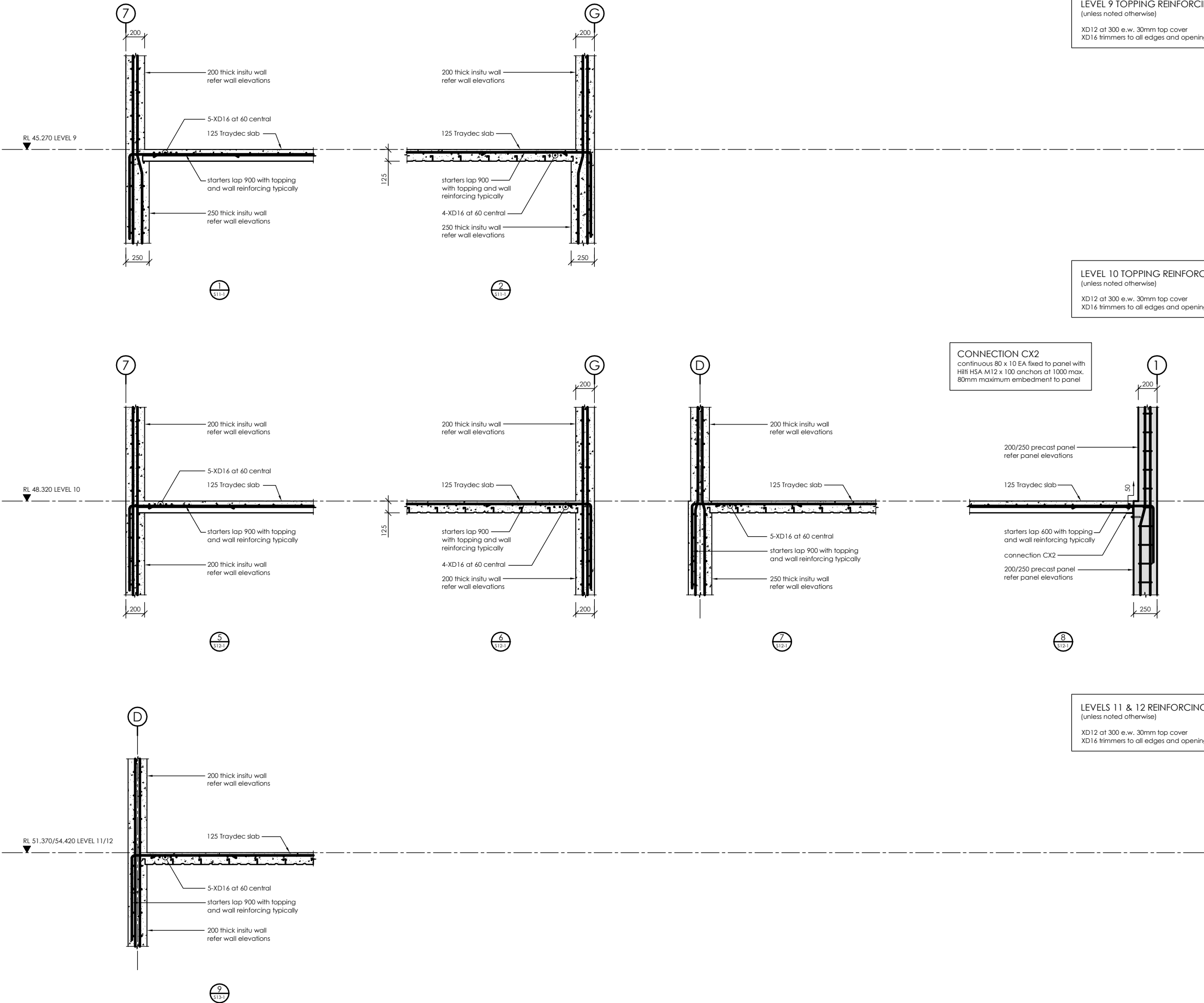
XD12 at 300 e.w. 30mm top cover  
XD16 trimmers to all edges and openings

CONNECTION CX2

continuous 80 x 10 EA fixed to panel with  
Hilti HSA M12 x 100 anchors at 1000 max.  
80mm maximum embedment to panel

LEVELS 11 & 12 REINFORCING  
(unless noted otherwise)

XD12 at 300 e.w. 30mm top cover  
XD16 trimmers to all edges and openings





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Typically all precast concrete and precast beams to be 35 MPa concrete unless noted otherwise.

All insitu interfaces and construction joints shall be thoroughly roughened to 5mm amplitude.

All precast to insitu interfaces and grouted joints shall be thoroughly roughened to 5mm amplitude.

All insitu walls to have XD starters  
All precast panels to have D starters  
All starters shall lap for full lap length beyond outermost drag bar where applicable

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at 150 centres for all primary UC beams  
at 200 centres for all secondary UB beams

Traydec units to typically have 70mm seating onto steel beams/angles/walls and 20mm side seating

All slab openings shall be trimmed with XD16 bars to all edges extend 600mm past opening u.n.o.

REV.	DATE	AMENDMENT	BY
A	22/01/08	CONSTRUCTION ISSUE	GPW
4	31/05/07	CONSENT ISSUE	GPW
3	22/03/07	TENDER UPDATE ISSUE	GPW
2	31/01/07	TENDER ISSUE	GPW
1	21/12/06	FOR CLIENT REVIEW	GPW

ARCHITECT:



lewis bradford  
CONSULTING ENGINEERS

PROJECT:

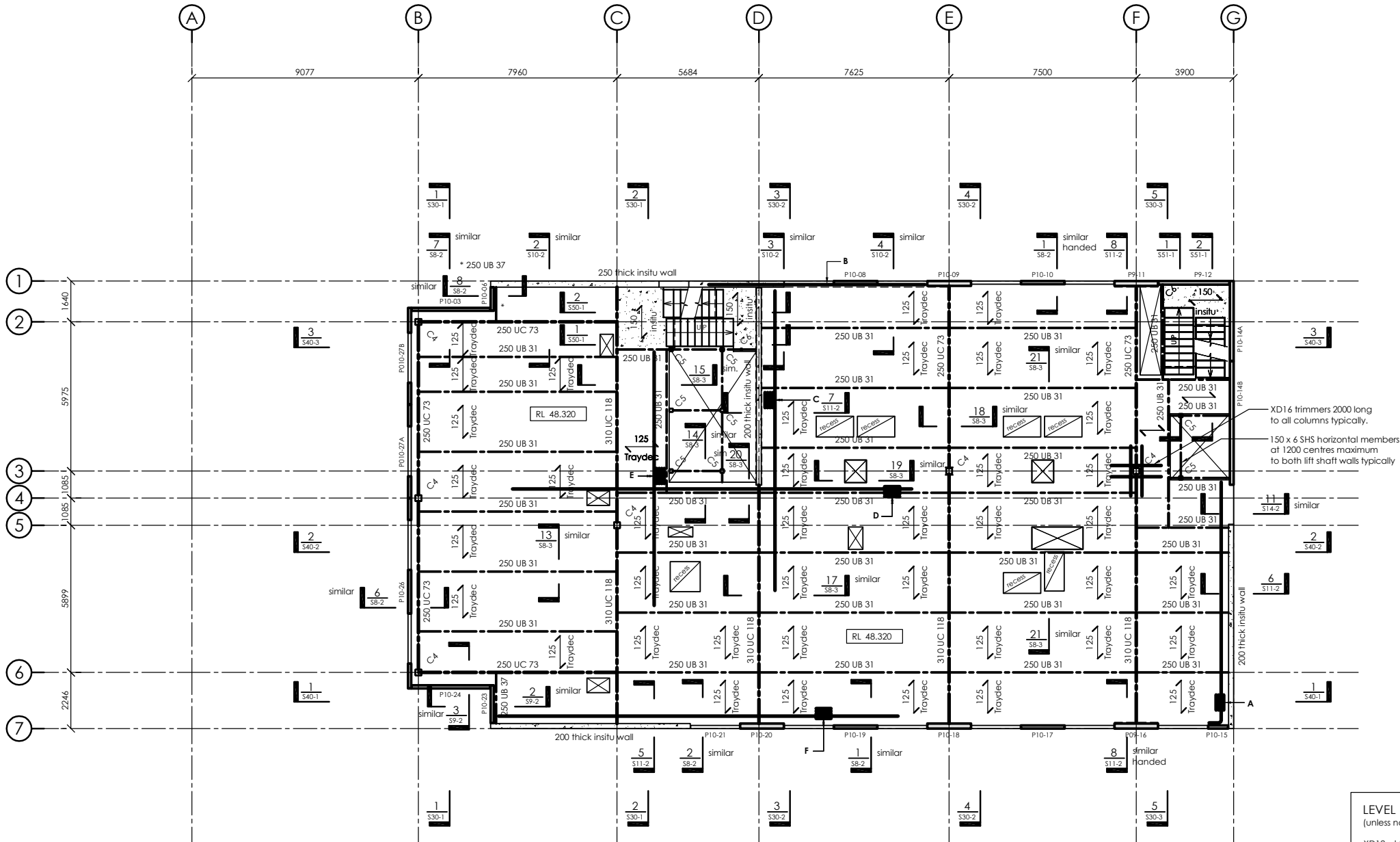
WARNERS NOVOTEL  
CHRISTCHURCH

DRAWING TITLE:

LEVEL 10 FLOOR PLAN

DRAWN: GPW	SCALE:	
ENGINEER: AJW	1:100 @ A1	
CHECKED: CBL	1:200 @ A3	
FILE: 106019	DRAWING NO. S12-1	REV. A

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LEVEL 10 FLOOR PLAN  
1:100

LEVEL 10 TOPPING REINFORCING  
(unless noted otherwise)

XD12 at 300 e.w. 30mm top cover  
XD16 trimmers to all edges and openings

all laps of topping bars to be staggered

all bars terminating at face of wall to have standard returns unless lapped with wall starters

concrete strength = 25MPa

note: Traydec units typically to have 70mm seating on steel beams and 20mm side seating to steel beams

PROPPING

In general Traydec slab (using continuous or double span sheets) does not require propping. Primary UC beams to be propped typically. 310 UC beams to be cambered 20mm upwards typically. Secondary UB beams to be propped at quarter points and cambered 15mm upwards typically. Secondary UC beams to be propped and cambered 10mm upwards typically.

recess 25mm slab recess for showers typically. refer Architect's drawings

LEVEL 10 DRAG BARS

A 4-XD16 at 60 central full width (as shown) with standard returns to one end

B 4-XD20 7600 long standard return to top bar only

C 5-XD16 at 60 central 12000 long

D 5-XD16 at 60 central 16000 long central on lift void opening note: bars run under C & E drag bars

E 5-XD16 at 60 central 10000 long

F 5-XD16 at 60 central 16000 long

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All insitu interfaces and construction joints shall be thoroughly roughened to 5mm amplitude.

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All precast panels to have D starters  
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A	22/01/08	CONSTRUCTION ISSUE	GPW
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2	31/01/07	TENDER ISSUE	GPW
1	21/12/06	FOR CLIENT REVIEW	GPW

ARCHITECT:



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PROJECT:

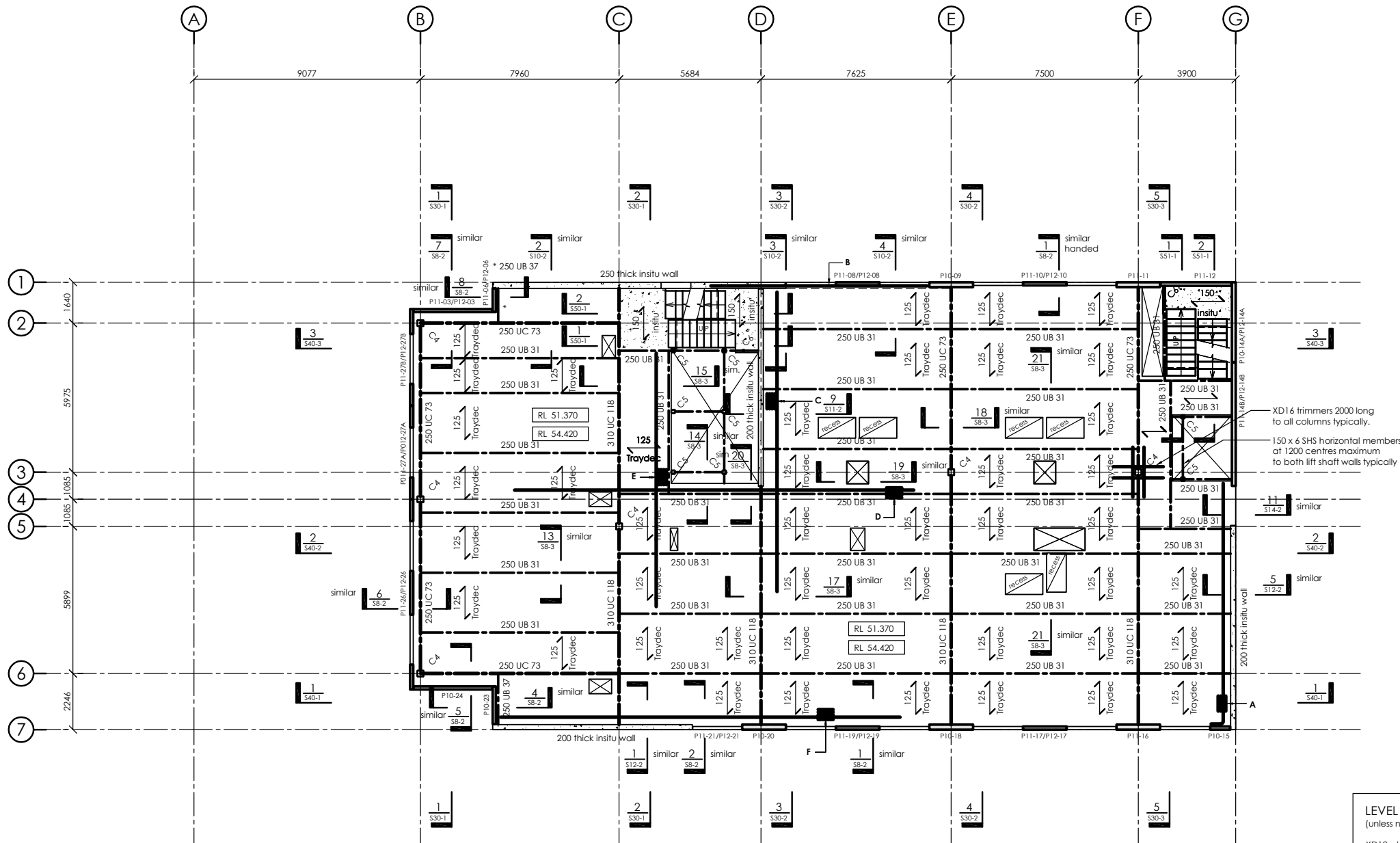
**WARNERS NOVOTEL  
CHRISTCHURCH**

DRAWING TITLE:

**LEVEL 11 & 12 FLOOR PLAN**

DRAWN: GPW	SCALE:	
ENGINEER: AJW	1:100 @ A1	
CHECKED: CBL	1:200 @ A3	
FILE: 106019	DRAWING NO. S13-1	REV. A

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**LEVEL 11 & 12 FLOOR PLAN**  
1:100

#### COLUMN LEGEND

- C1 500 x 500 concrete column (40MPa concrete)
- C2 600 x 600 concrete column
- C3 310 UC 158 steel column
- C4 250 x 9 SHS steel column
- C5 150 x 9 SHS steel column
- C6 89 x 6 SHS steel column
- C7 310 UC 198 steel column
- C8 200 UC 52 steel column
- C9 125 x 9 SHS steel column
- C10 100 x 9 SHS steel column

#### LEVEL 11/12 TOPPING REINFORCING (unless noted otherwise)

XD12 at 300 e.w. 30mm top cover  
XD16 trimmers to all edges and openings

all laps of topping bars to be staggered

all bars terminating at face of wall to have standard returns unless lapped with wall starters

concrete strength = 25MPa

note: Traydec units typically to have 70mm seating on steel beams and 20mm side seating to steel beams

#### PROPPING

In general Traydec slab (using continuous or double span sheets) does not require propping. Primary UC beams to be propped typically. 310 UC beams to be cambered 20mm upwards typically. Secondary UB beams to be propped at quarter points and cambered 15mm upwards typically. Secondary UC beams to be propped and cambered 10mm upwards typically.

recess 25mm slab recess for showers typically. refer Architect's drawings

#### LEVEL 11/12 DRAG BARS

- A 4-XD16 at 60 central full width (as shown) with standard returns to one end
- B 4-XD20 central to wall Gridline 1 lap 3000 with wall reinforcing
- C 5-XD16 at 60 central 12000 long
- D 5-XD16 at 60 central 16000 long central on lift void opening note: bars run under C & E drag bars
- E 5-XD16 at 60 central 10000 long
- F 5-XD16 at 60 central 16000 long

NOTES :

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All precast panels to have D starters

All precast panels to have D starters  
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outermost drag bar where applicable

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at 150 centres for all primary UC beams  
at 200 centres for all secondary UB beams

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70mm seating onto steel beams/angles/walls  
and 20mm side seating

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C	13/11/08	CONSENT UPDATE	GPW
B	19/05/08	CONSENT UPDATE	GPW
A	22/01/08	CONSTRUCTION ISSUE	GPW
4	31/05/07	CONSENT ISSUE	GPW
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2	31/01/07	TENDER ISSUE	GPW
1	21/12/06	FOR CLIENT REVIEW	GPW
REV.	DATE	AMENDMENT	BY

ARCHITECT:



**lewis bradford**  
CONSULTING ENGINEERS

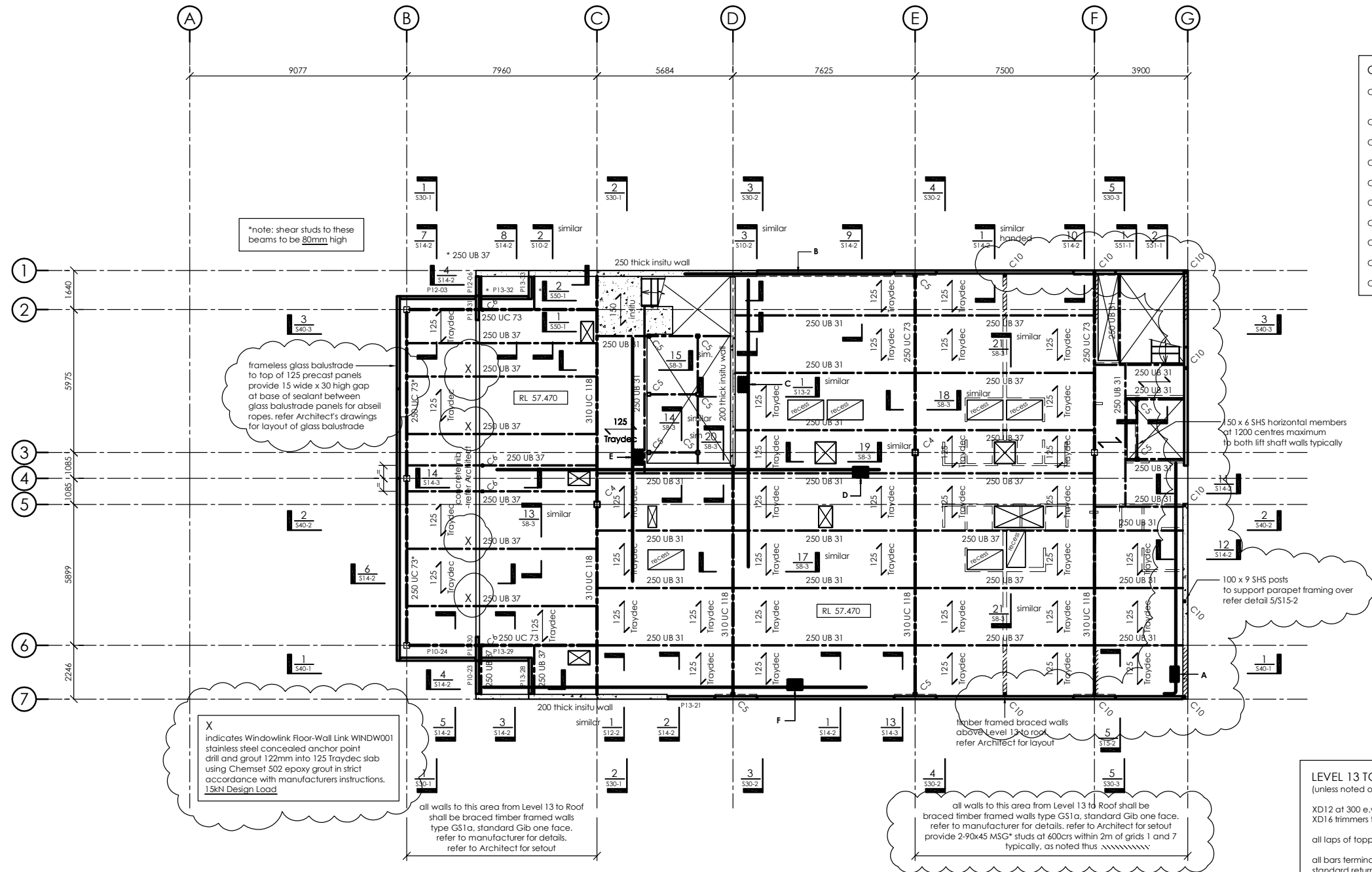
PROJECT:

WARNERS NOVOTEL  
CHRISTCHURCH

DRAWING TITLE:

### LEVEL 13 FLOOR PLAN

DRAWN: <b>GPW</b>	SCALE:  1:100 @ A1  1:200 @ A3	
ENGINEER: <b>AJW</b>		
CHECKED: <b>CBL</b>		
FILE: <b>106019</b>	DRAWING NO. <b>S14-1</b>	REV. <b>C</b>



### LEVEL 13 FLOOR PLAN

1:100

LEVEL 13 DRAG BARS

- |          |   |
|----------|---|
| <b>A</b> | 4-XD16 at 60 central full width (as shown)<br>with standard returns to one end  |
| <b>B</b> | 4-XD20 central to wall Gridline 1<br>lap 3000 with wall reinforcing   |
| <b>C</b> | 5-XD16 at 60 central 12000 long   |
| <b>D</b> | 5-XD16 at 60 central 16000 long<br>central on lift void opening<br>note: bars run under <b>C</b> & <b>E</b> drag bars |
| <b>E</b> | 5-XD16 at 60 central 10000 long   |
| <b>F</b> | 5-XD16 at 60 central 16000 long   |

## PROPPING

In general Traydec slab (using continuous or double span sheets) does not require propping.  
Primary UC beams to be propped typically.  
310 UC beams to be cambered  
20mm upwards typically.  
Secondary UB beams to be propped at  
quarter points and cambered  
15mm upwards typically.  
Secondary UC beams to be propped and  
cambered 10mm upwards typically.

recess 25mm slab recess for showers typically.  
refer Architect's drawings



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A	22/01/08	CONSTRUCTION ISSUE	GPW
1	31/05/07	CONSENT ISSUE	GPW
REV.	DATE	AMENDMENT	BY

ARCHITECT:



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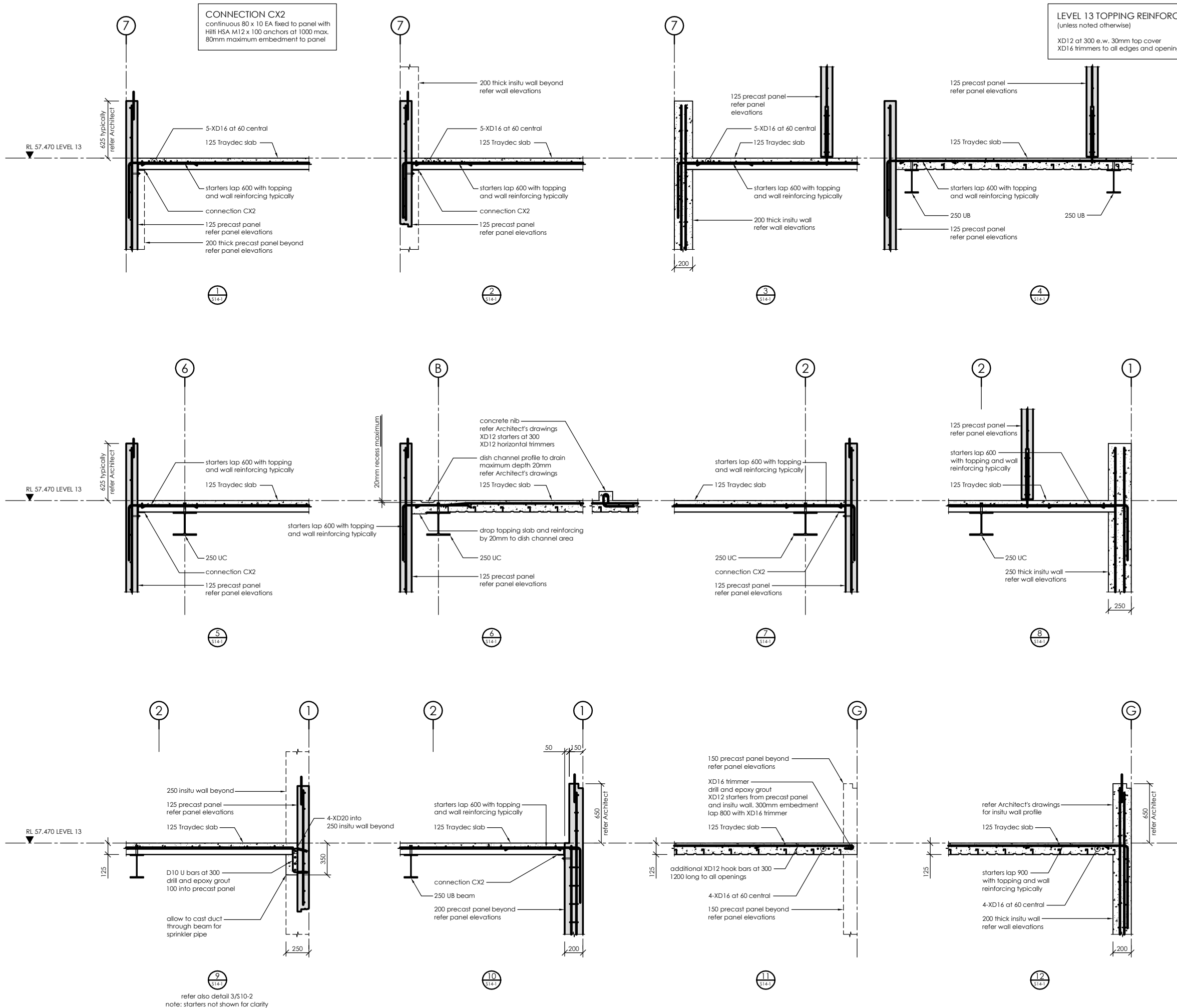
WARNERS NOVOTEL  
CHRISTCHURCH

DRAWING TITLE:

LEVEL 13 DETAILS  
SHEET 1 OF 2

DRAWN:	GPW	SCALE:	1:20 @ A1
ENGINEER:	AJW		1:40 @ A3
CHECKED:	CBL		
FILE:	106019	DRAWING NO.	S14-2
		REV.	A

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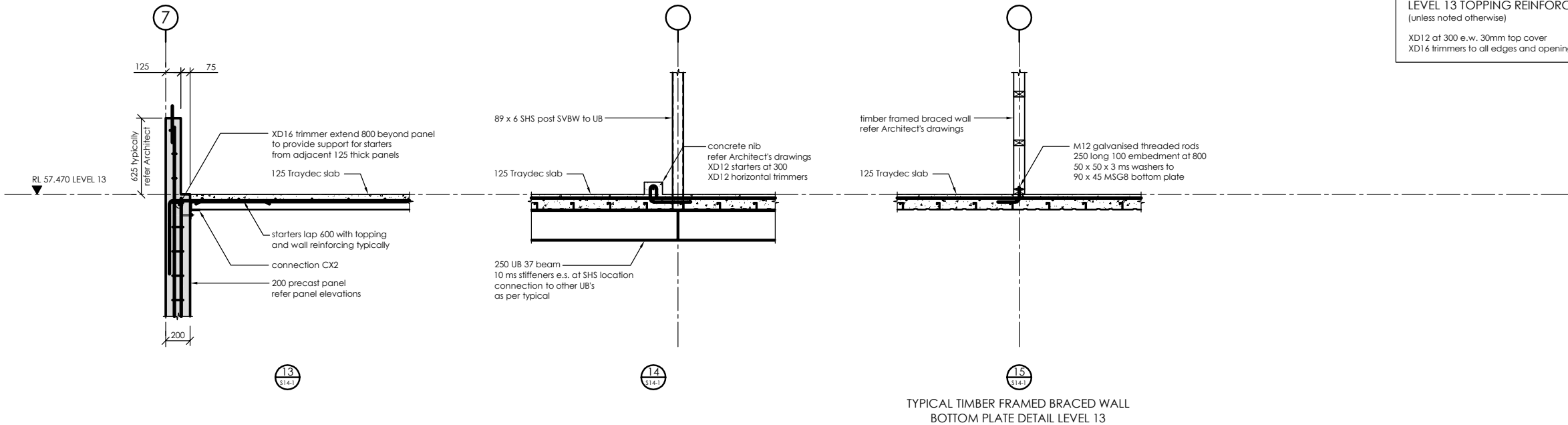
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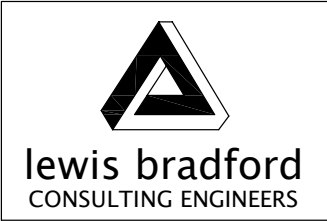
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All slab openings shall be trimmed with XD16 bars to all edges extend 600mm past opening u.n.o.

LEVEL 13 TOPPING REINFORCING  
(unless noted otherwise)  
XD12 at 300 e.w. 30mm top cover  
XD16 trimmers to all edges and openings



B	19/05/08	CONSENT UPDATE	GPW
A	22/01/08	CONSTRUCTION ISSUE	GPW
I	31/05/07	CONSENT ISSUE	GPW
REV.	DATE	AMENDMENT	BY



PROJECT:

WARNERS NOVOTEL  
CHRISTCHURCH

DRAWING TITLE:

LEVEL 13 DETAILS  
SHEET 2 OF 2

DRAWN: GPW	SCALE:	
ENGINEER: AJW	1:20 @ A1	
CHECKED: CBL	1:40 @ A3	
FILE: 106019	DRAWING NO. S14-3	REV. B

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REV.	DATE	AMENDMENT	BY
5	13/11/08	CONSENT UPDATE	GPW
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1	21/12/06	FOR CLIENT REVIEW	GPW

ARCHITECT:



lewis bradford  
CONSULTING ENGINEERS

PROJECT:

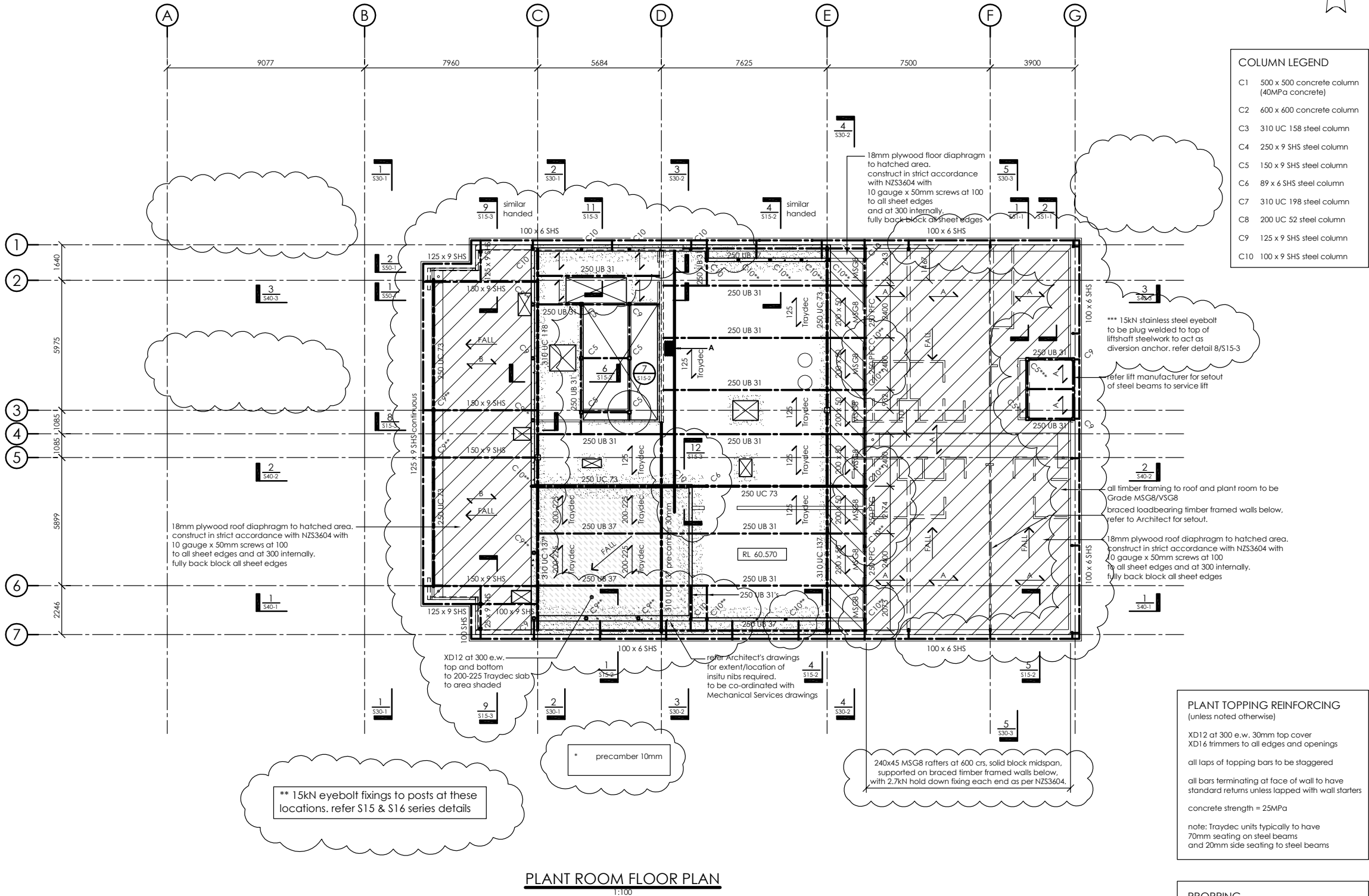
WARNERS NOVOTEL  
CHRISTCHURCH

DRAWING TITLE:

PLANT ROOM FLOOR PLAN

DRAWN: GPW	SCALE: 1:100 @ A1
ENGINEER: AJW	1:200 @ A3
CHECKED:	
FILE: 106019	DRAWING NO. S15-1
	REV. 5

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PLANT ROOM FLOOR PLAN  
1:100

A	240 x 45 MSG8 timber joists at 600 c/s
B	290 x 45 MSG8 timber joists at 600 c/s

PLANT ROOM DRAG BARS	
A	5-XD16 at 60 central 12000 long

PLANT TOPPING REINFORCING (unless noted otherwise)	
XD12 at 300 e.w. 30mm top cover XD16 trimmers to all edges and openings	
all laps of topping bars to be staggered	
all bars terminating at face of wall to have standard returns unless lapped with wall starters	
concrete strength = 25MPa	
note: Traydec units typically to have 70mm seating on steel beams and 20mm side sealing to steel beams	

PROPPING	
In general Traydec slab (using continuous or double span sheets) does not require propping. Primary UC beams to be propped typically. 310 UC beams to be cambered 20mm upwards typically. Secondary UB beams to be propped at quarter points and cambered 15mm upwards typically. Secondary UC beams to be propped and cambered 10mm upwards typically.	

recess	25mm slab recess for showers typically. refer Architect's drawings
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CONTRACTOR TO VERIFY ALL DIMENSIONS ON SITE  
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NOTES :

Refer notes sheet at the start of drawing set for notes typically

All structural steel shall be mild steel conforming to NZS 3404:1997.

Refer Architect's drawings for details of drilled hole requirements to suit timber plate fixings to steel work members unless detailed otherwise.

Surface preparation and corrosion protection of steel work shall be in accordance with the Specification.

All exposed ends of RHS members to be capped with ex. 10mm ms plate unless shown otherwise.

All plates shall be 10mm minimum unless noted otherwise.

Unless shown otherwise, all welds are to be 6 fillet weld all round refer to the Specification for type and class of weld.

Mild steel flat anchors to weldplates to have minimum bend radius of  $2.5 \times$  thickness of flat and bent around a former pin.

All bolts and nuts shall be grade 8.8 high strength.

All holding down bolts and other fixing devices, shall have a minimum yield stress of 240 MPa unless noted otherwise.

Provide 20Ø nom. Nelson shear studs 100 long  
to all steel beams welded in accordance with  
AS 1554 Part 2.  
at 150 centres for all primary UC beams  
at 200 centres for all secondary UB beams

All exterior steel work to be hot dip galvanised in accordance with AS 1650, unless noted otherwise.

All load bearing steel work (including columns, beams, etc.) will require specific fire rating. Refer to Fire Engineer and/or Architect for requirements, details, and fire rating options.

All dry pack mortar/grout shall have a compressive strength of at least 40 MPa.

The Contractor shall provide two copies of the shop drawings for the structural steel work to the Engineer for approval, 14 days prior to manufacture.

2	13/11/08	CONSENT UPDATE	GPW
1	19/05/08	CONSENT UPDATE	GPW
REV.	DATE	AMENDMENT	BY

ARCHITECT:



**lewis bradford**  
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PROJECT:

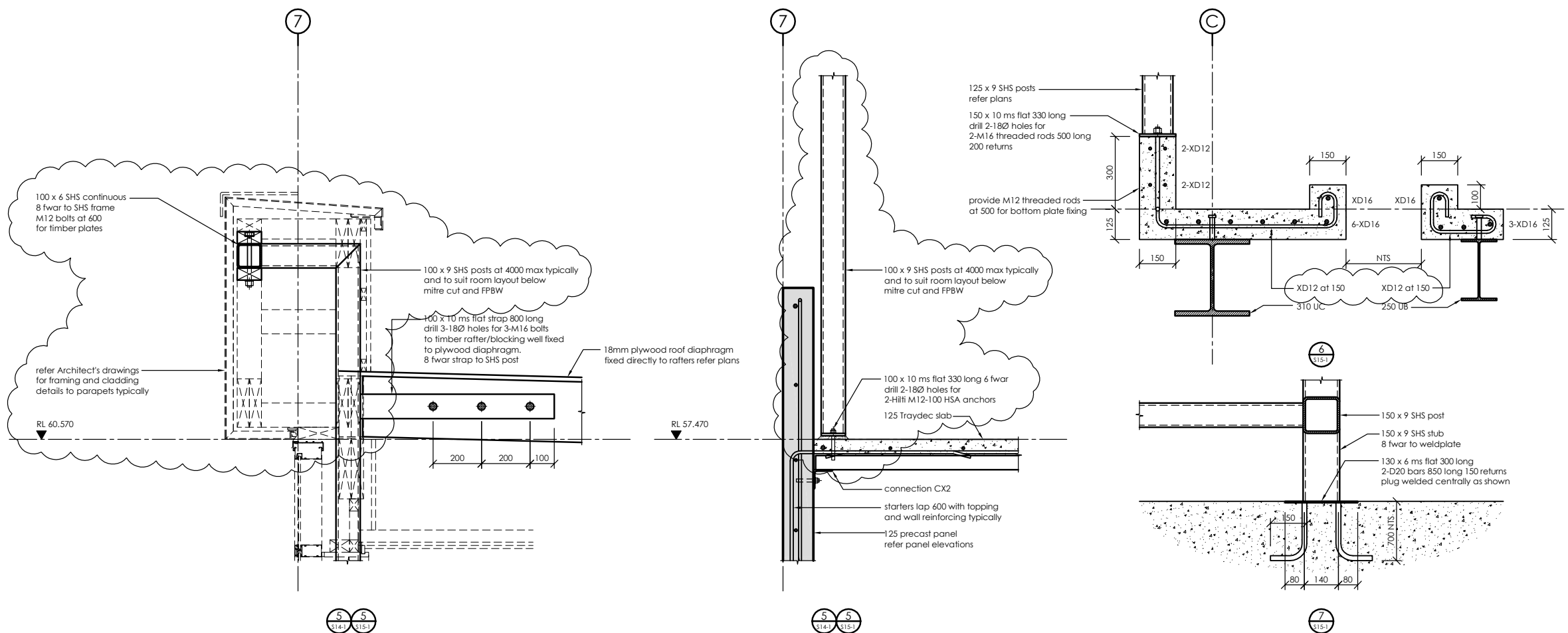
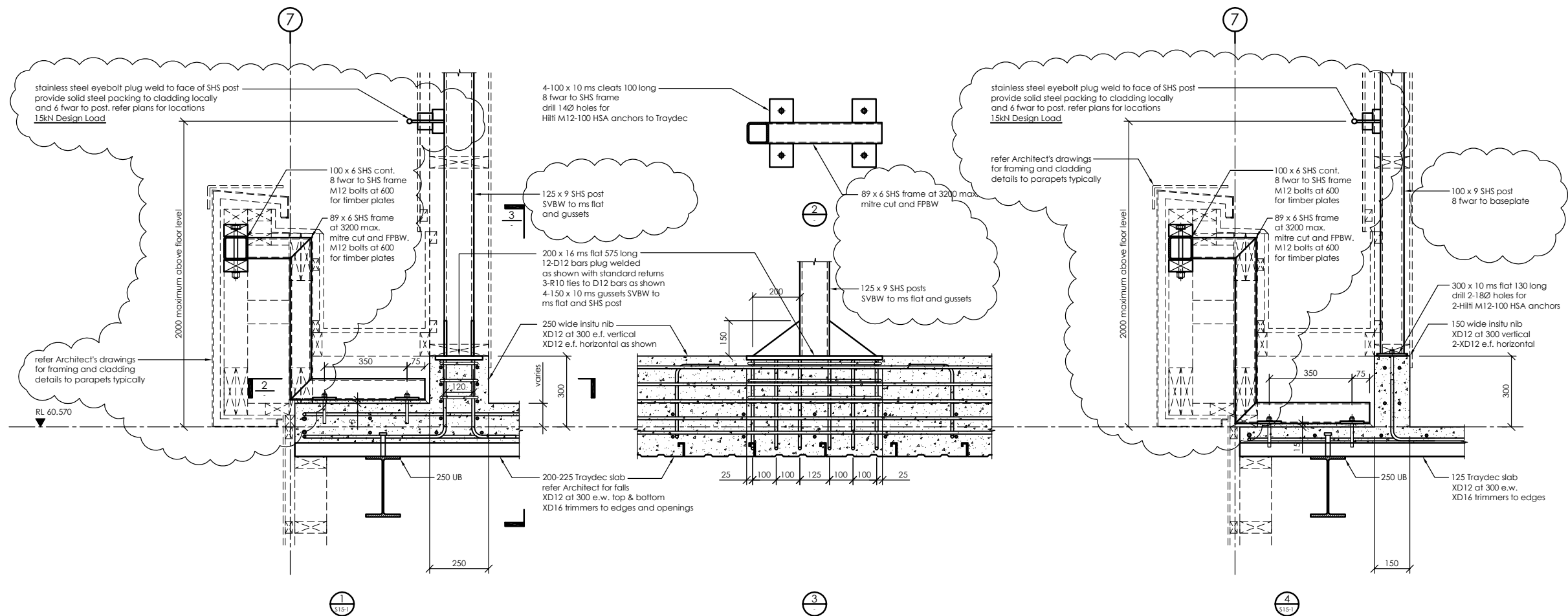
WARNERS NOVOTEL  
CHRISTCHURCH

DRAWING TITLE:

PLANT ROOM DETAILS  
SHEET 1 OF 2

DRAWN: GPW	SCALE:  1:10 @ A1  1:20 @ A3	
ENGINEER: AJW		
CHECKED:		
FILE: 106019	DRAWING NO. S15-2	REV. 2

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TYPICAL C10 POST DETAIL TO GRIDLINES E.5 - G ROOF AREA

refer also detail 1/S14-2

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CONTRACTOR TO VERIFY ALL DIMENSIONS ON SITE  
REFER TO ARCHITECT'S DRAWING FOR ALL SETOUTS

NOTES :

Refer notes sheet at the start of drawing set for notes typically

All structural steel shall be mild steel conforming to NZS 3404:1997.

Refer Architect's drawings for details of drilled hole requirements to suit timber plate fixings to steel work members unless detailed otherwise.

Surface preparation and corrosion protection of steel work shall be in accordance with the Specification.

All exposed ends of RHS members to be capped with ex. 10mm ms plate unless shown otherwise.

All plates shall be 10mm minimum unless noted otherwise.

Unless shown otherwise, all welds are to be 6 fillet weld all round refer to the Specification for type and class of weld.

Mild steel flat anchors to weldplates to have minimum bend radius of 2.5 x thickness of flat and bent around a former pin.

All bolts and nuts shall be grade 8.8 high strength.

All holding down bolts and other fixing devices, shall have a minimum yield stress of 240 MPa unless noted otherwise.

Provide 200 nom. Nelson shear studs 100 long to all steel beams welded in accordance with AS 1554 Part 2.  
at 150 centres for all primary UC beams  
at 200 centres for all secondary UB beams

All exterior steel work to be hot dip galvanised in accordance with AS 1650, unless noted otherwise.

All load bearing steel work (including columns, beams, etc.) will require specific fire rating. Refer to Fire Engineer and/or Architect for requirements, details, and fire rating options.

All dry pack mortar/grout shall have a compressive strength of at least 40 MPa.

The Contractor shall provide two copies of the shop drawings for the structural steel work to the Engineer for approval, 14 days prior to manufacture.

2	13/11/08	CONSENT UPDATE	GPW
1	19/05/08	CONSENT UPDATE	GPW
REV.	DATE	AMENDMENT	BY

ARCHITECT:



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PROJECT:

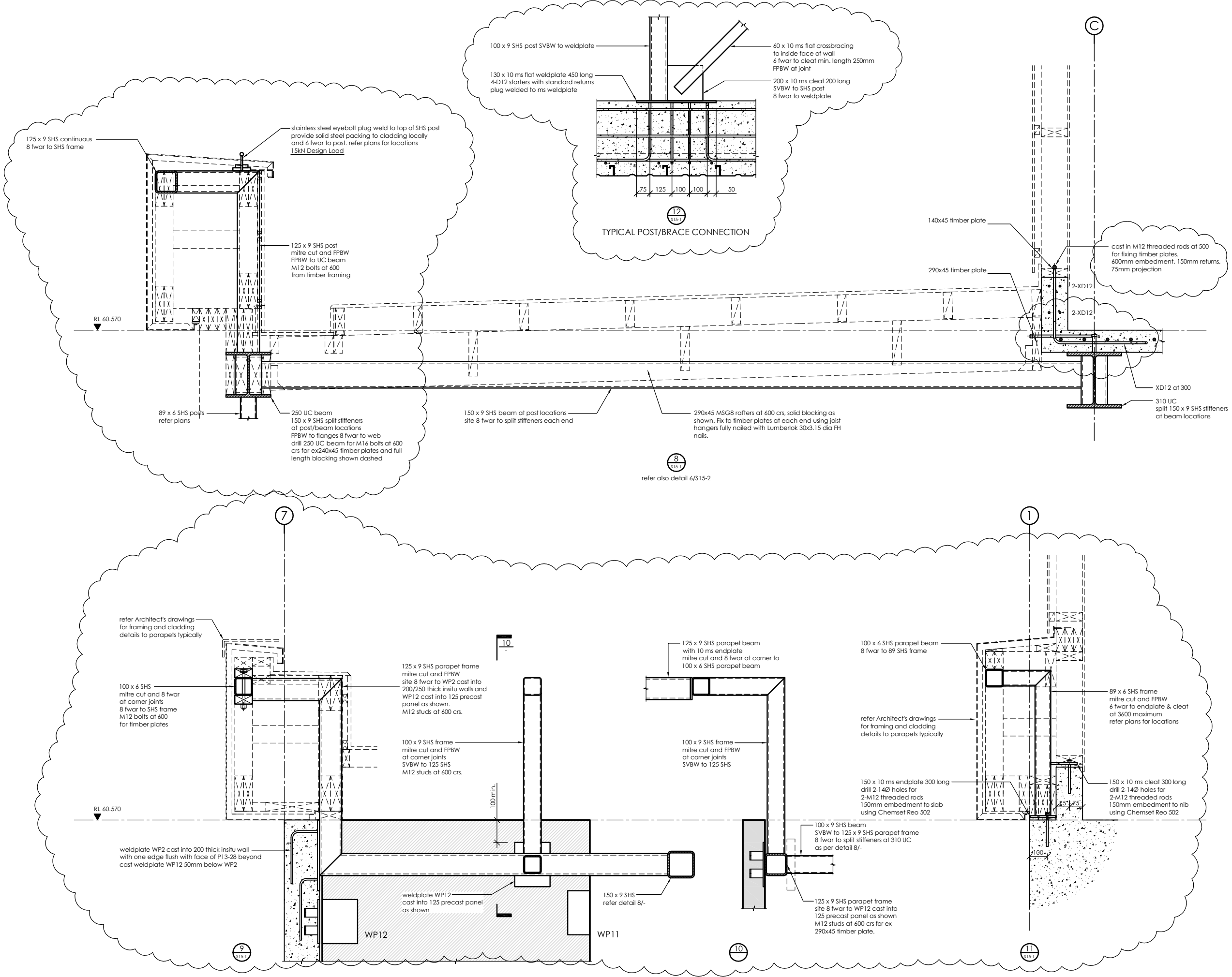
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CHRISTCHURCH

DRAWING TITLE:

PLANT ROOM DETAILS  
SHEET 2 OF 2

DRAWN:	GPW	SCALE:	
ENGINEER:	AJW		1:10 @ A1
CHECKED:			1:20 @ A3
FILE:	106019	DRAWING NO.	S15-3
		REV.	2

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All plates shall be 10mm minimum unless noted otherwise.

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Mild steel flat anchors to weldplates to have minimum bend radius of 2.5 x thickness of flat and bent around a former pin.

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All holding down bolts and other fixing devices, shall have a minimum yield stress of 240 MPa unless noted otherwise.

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at 150 centres for all primary UC beams  
at 200 centres for all secondary UB beams

All exterior steel work to be hot dip galvanised in accordance with AS 1650, unless noted otherwise.

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All dry pack mortar/grout shall have a compressive strength of at least 40 MPa.

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REV.	DATE	AMENDMENT	BY
5	13/11/08	CONSENT UPDATE	GPW
4	19/05/08	CONSENT UPDATE	GPW
3	31/05/07	CONSENT ISSUE	GPW
2	31/01/07	TENDER ISSUE	GPW
1	21/12/06	FOR CLIENT REVIEW	GPW

ARCHITECT:



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CONSULTING ENGINEERS

PROJECT:

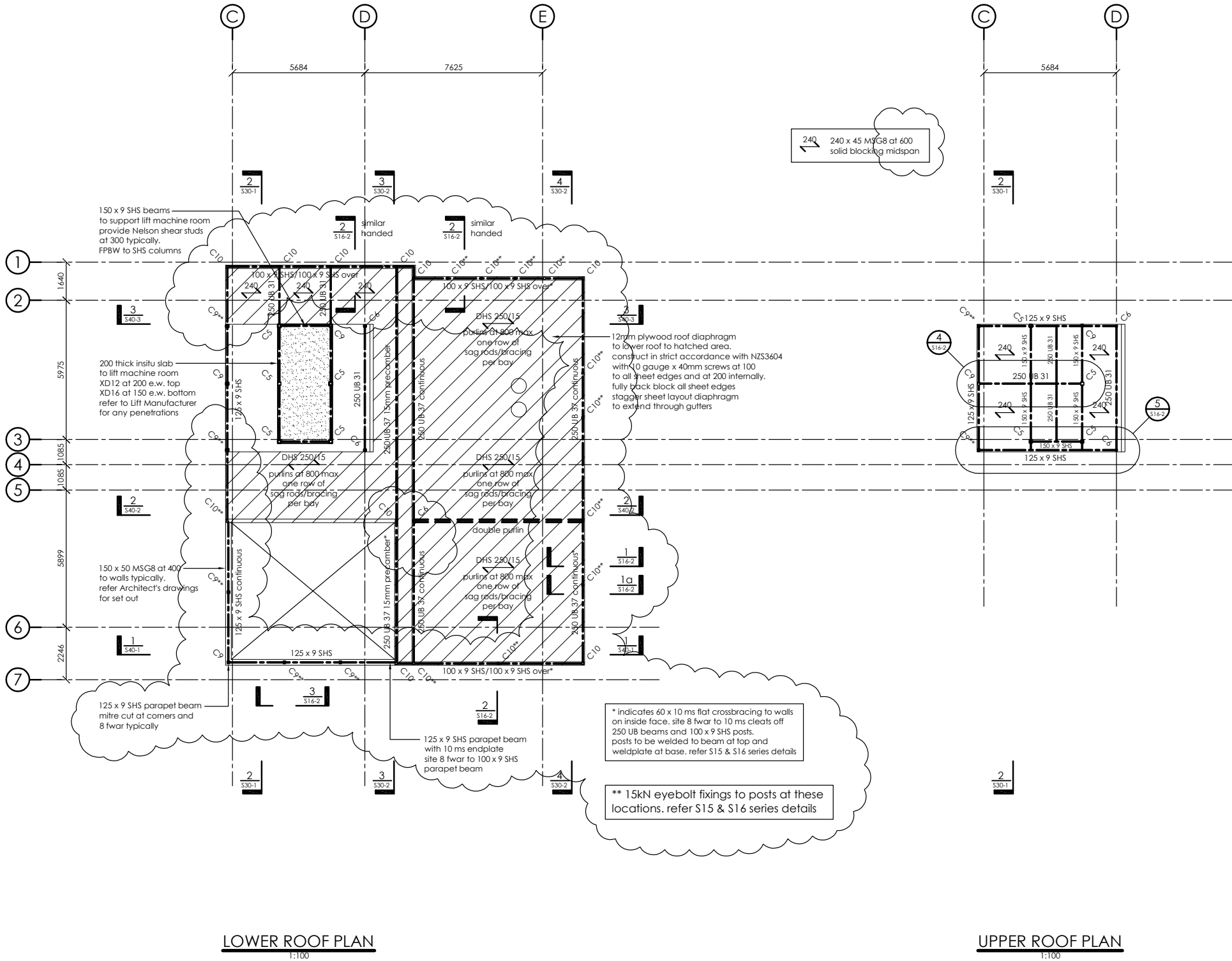
WARNERS NOVOTEL  
CHRISTCHURCH

DRAWING TITLE:

ROOF PLAN

DRAWN: GPW	SCALE:	
ENGINEER: AJW	1:100 @ A1	
CHECKED:	1:200 @ A3	
FILE: 106019	DRAWING NO. S16-1	REV. 5

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All structural steel shall be mild steel conforming to NZS 3404:1997.

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All exposed ends of RHS members to be capped with ex. 10mm ms plate unless shown otherwise.

All plates shall be 10mm minimum unless noted otherwise.

Unless shown otherwise, all welds are to be 6 fillet weld all round refer to the Specification for type and class of weld.

Mild steel flat anchors to weldplates to have minimum bend radius of 2.5 x thickness of flat and bent around a former pin.

All bolts and nuts shall be grade 8.8 high strength.

All holding down bolts and other fixing devices, shall have a minimum yield stress of 240 MPa unless noted otherwise.

Provide 200 nom. Nelson shear studs 100 long to all steel beams welded in accordance with AS 1554 Part 2.  
at 150 centres for all primary UC beams  
at 200 centres for all secondary UB beams

All exterior steel work to be hot dip galvanised in accordance with AS 1650, unless noted otherwise.

All load bearing steel work (including columns, beams, etc.) will require specific fire rating. Refer to Fire Engineer and/or Architect for requirements, details, and fire rating options.

All dry pack mortar/grout shall have a compressive strength of at least 40 MPa.

The Contractor shall provide two copies of the shop drawings for the structural steel work to the Engineer for approval, 14 days prior to manufacture.

2	13/11/08	CONSENT UPDATE	GPW
1	19/05/08	CONSENT UPDATE	GPW
REV.	DATE	AMENDMENT	BY

ARCHITECT:



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CONSULTING ENGINEERS

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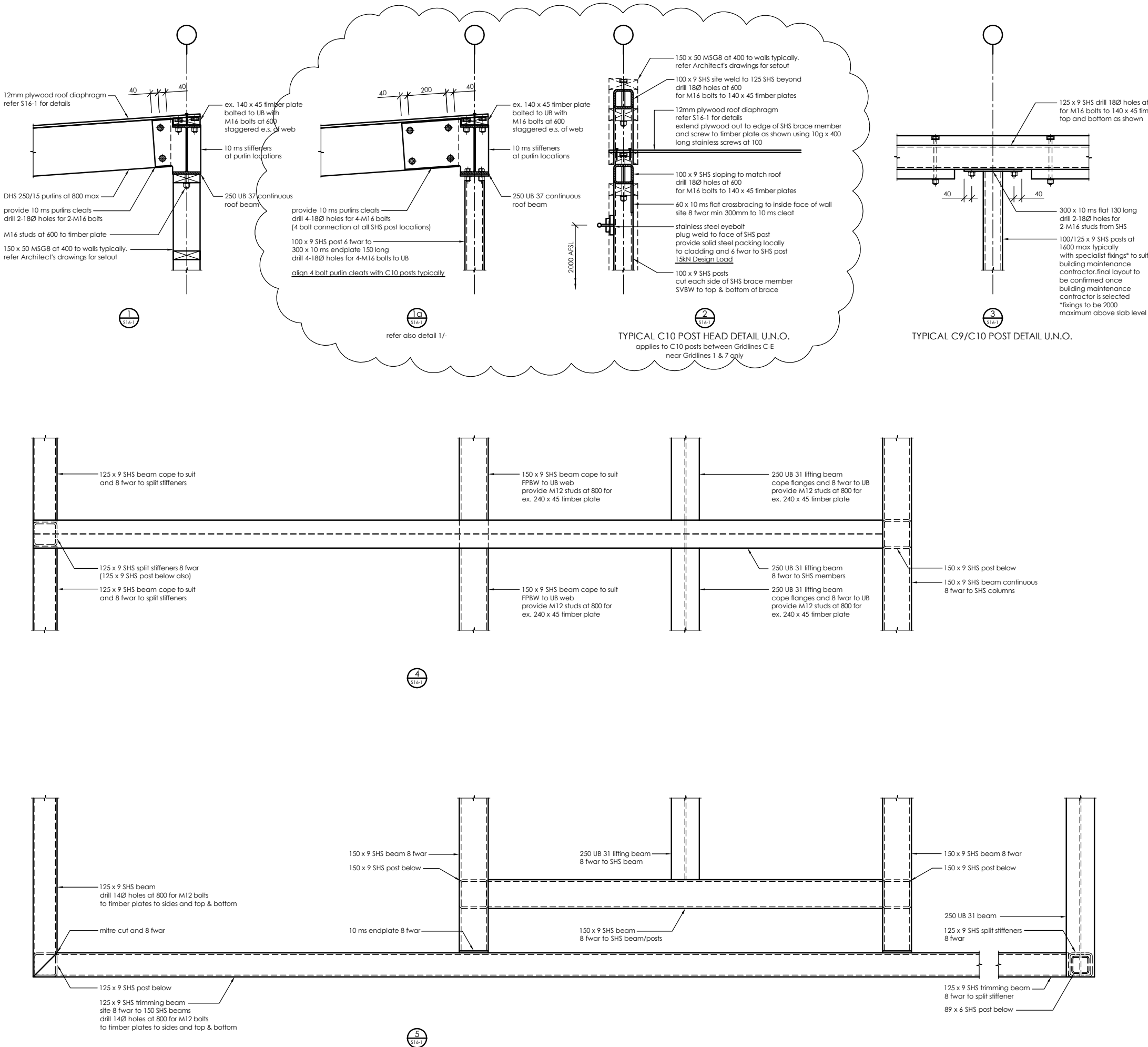
WARNERS NOVOTEL  
CHRISTCHURCH

DRAWING TITLE:

ROOF DETAILS  
SHEET 1 OF 1

DRAWN:	GPW	SCALE:	1:10 @ A1
ENGINEER:	AJW		1:20 @ A3
CHECKED:			
FILE:	106019	DRAWING NO.	S16-2
		REV.	2

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NOTES:

Refer notes sheet at the start of drawing set for notes typically

Refer Architects drawings for all set out dimensions, opening sizes, slab set downs, rebates, sealants etc.

Refer S21 series for typical details of 125mm thick precast panels

Refer S22 series for typical details of insitu walls and structural precast panels greater than 125mm thick

REINFORCING BAR LAPS		
Bar size	Lap length concrete	Lap length concrete block
D12	500 mm	500 mm
D16	650 mm	650 mm
D20	800 mm	800 mm
D25	1000 mm	1000 mm
D32	1300 mm	1300 mm
XD12	700 mm	850 mm
XD16	800 mm	1100 mm
XD20	1000 mm	1400 mm
XD25	1250 mm	1750 mm
XD32	1600 mm	2250 mm

Typically all insitu concrete wall elements to be 30 MPa concrete unless noted otherwise.

Typically all precast concrete and precast beams to be 35 MPa concrete unless noted otherwise.

Unless shown otherwise all horizontal and vertical precast panel joints to be 15mm.

All insitu interfaces and construction joints shall be thoroughly roughened to 5mm amplitude.

All precast to insitu interfaces and grouted joints shall be thoroughly roughened to 5mm amplitude.

Typically horizontal bars in double reinforced panels are to be outside vertical reinforcing 35mm cover to outside bars typical

The lifting and transporting etc., of all panels is the responsibility of the Contractor, this includes the provision of strong backs as required (refer Specification).

The Contractor shall provide two copies of the shop drawings for precast concrete work to the Engineer for approval 14 days prior to manufacture.

REV.	DATE	AMENDMENT	BY
A	22/01/08	CONSTRUCTION ISSUE	GPW
3	31/05/07	CONSENT ISSUE	GPW
2	31/01/07	TENDER ISSUE	GPW
1	21/12/06	FOR CLIENT REVIEW	GPW

ARCHITECT:



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PROJECT:

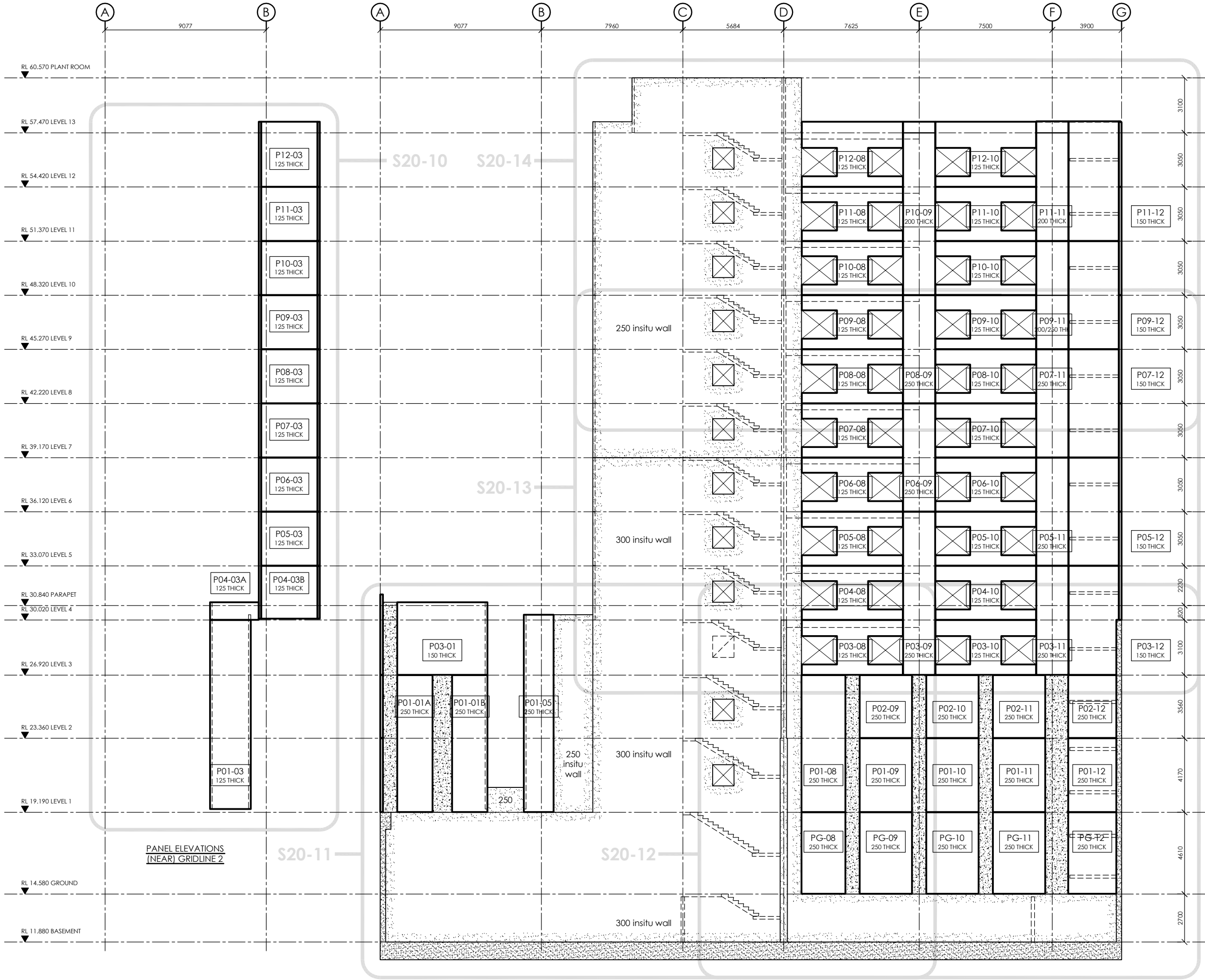
WARNERS NOVOTEL  
CHRISTCHURCH

DRAWING TITLE:

GENERAL ARRANGEMENT  
PRECAST PANEL/  
WALL ELEVATIONS  
GRIDLINES 1 & 2

DRAWN: GPW	SCALE:	
ENGINEER: AJW	1:100 @ A1	
CHECKED: CBL	1:200 @ A3	
FILE: 106019	DRAWING NO. S20-1	REV. A

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REFER TO ARCHITECT'S DRAWING FOR ALL SETOUTS

NOTES:

Refer notes sheet at the start of drawing set for notes typically

Refer Architects drawings for all set out dimensions, opening sizes, slab set downs, rebates, sealants etc.

Refer S21 series for typical details of 125mm thick precast panels

Refer S22 series for typical details of insitu walls and structural precast panels greater than 125mm thick

REINFORCING BAR LAPS		
Bar size	Lap length concrete	Lap length concrete block
D12	500 mm	500 mm
D16	650 mm	650 mm
D20	800 mm	800 mm
D25	1000 mm	1000 mm
D32	1300 mm	1300 mm
XD12	700 mm	850 mm
XD16	800 mm	1100 mm
XD20	1000 mm	1400 mm
XD25	1250 mm	1750 mm
XD32	1600 mm	2250 mm

Typically all insitu concrete wall elements to be 30 MPa concrete unless noted otherwise.

Typically all precast concrete and precast beams to be 35 MPa concrete unless noted otherwise.

Unless shown otherwise all horizontal and vertical precast panel joints to be 15mm.

All insitu interfaces and construction joints shall be thoroughly roughened to 5mm amplitude.

All precast to insitu interfaces and grouted joints shall be thoroughly roughened to 5mm amplitude.

Typically horizontal bars in double reinforced panels are to be outside vertical reinforcing 35mm cover to outside bars typical

The lifting and transporting etc., of all panels is the responsibility of the Contractor, this includes the provision of strong backs as required (refer Specification).

The Contractor shall provide two copies of the shop drawings for precast concrete work to the Engineer for approval 14 days prior to manufacture.

REV.	DATE	AMENDMENT	BY
A	22/01/08	CONSTRUCTION ISSUE	GPW
4	31/05/07	CONSENT ISSUE	GPW
3	22/03/07	TENDER UPDATE ISSUE	GPW
2	31/01/07	TENDER ISSUE	GPW
1	21/12/06	FOR CLIENT REVIEW	GPW

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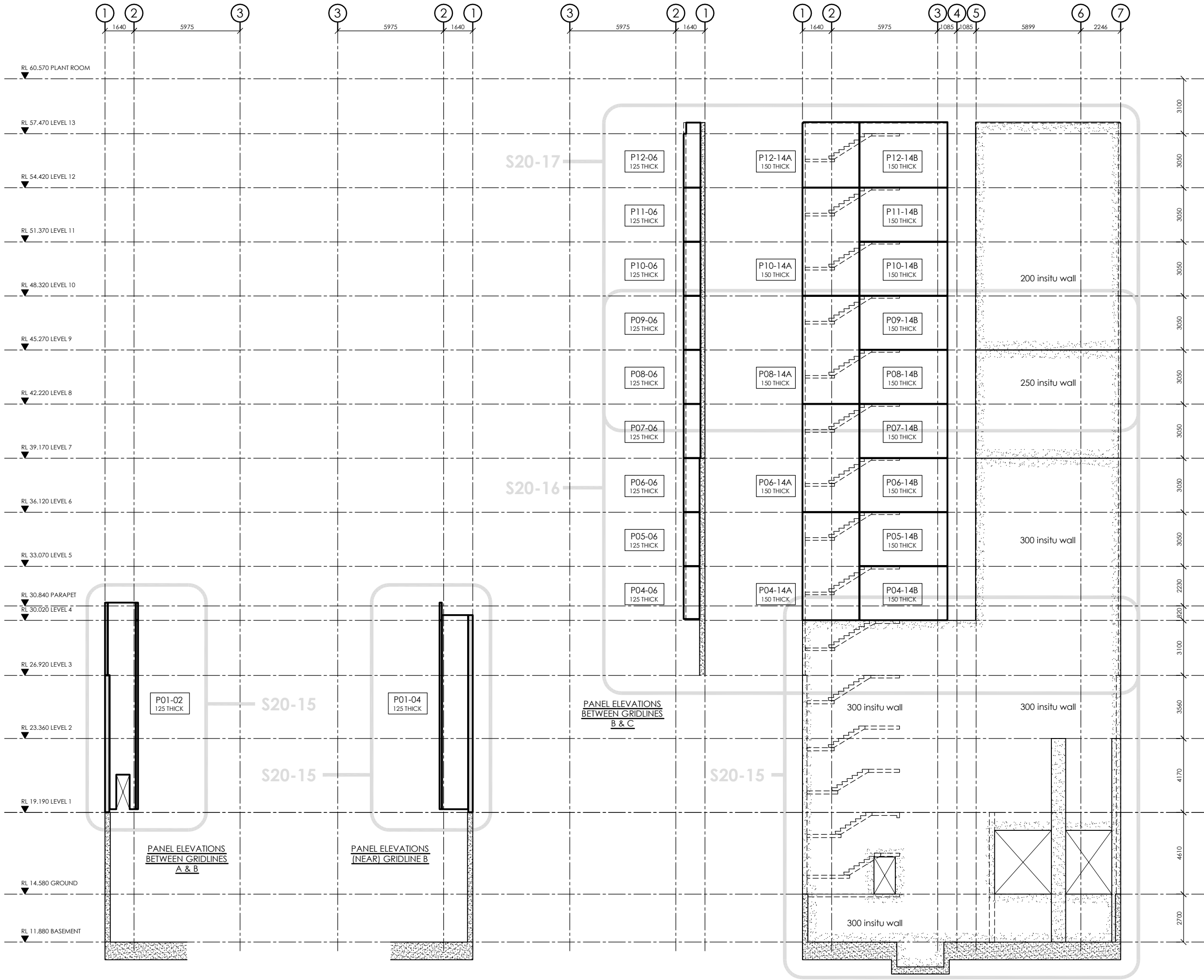
WARNERS NOVOTEL  
CHRISTCHURCH

DRAWING TITLE:

GENERAL ARRANGEMENT  
PRECAST PANEL/  
WALL ELEVATIONS  
GRIDLINE G

DRAWN: GPW	SCALE:	
ENGINEER: AJW	1:100 @ A1	
CHECKED: CBL	1:200 @ A3	
FILE: 106019	DRAWING NO. S20-2	REV. A

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NOTES:

Refer notes sheet at the start of drawing set for notes typically

Refer Architects drawings for all set out dimensions, opening sizes, slab set downs, rebates, sealants etc.

Refer S21 series for typical details of 125mm thick precast panels

Refer S22 series for typical details of insitu walls and structural precast panels greater than 125mm thick

REINFORCING BAR LAPS		
Bar size	Lap length concrete	Lap length concrete block
D12	500 mm	500 mm
D16	650 mm	650 mm
D20	800 mm	800 mm
D25	1000 mm	1000 mm
D32	1300 mm	1300 mm
XD12	700 mm	850 mm
XD16	800 mm	1100 mm
XD20	1000 mm	1400 mm
XD25	1250 mm	1750 mm
XD32	1600 mm	2250 mm

Typically all insitu concrete wall elements to be 30 MPa concrete unless noted otherwise.

Typically all precast concrete and precast beams to be 35 MPa concrete unless noted otherwise.

Unless shown otherwise all horizontal and vertical precast panel joints to be 15mm.

All insitu interfaces and construction joints shall be thoroughly roughened to 5mm amplitude.

All precast to insitu interfaces and grouted joints shall be thoroughly roughened to 5mm amplitude.

Typically horizontal bars in double reinforced panels are to be outside vertical reinforcing 35mm cover to outside bars typical

The lifting and transporting etc., of all panels is the responsibility of the Contractor, this includes the provision of strong backs as required (refer Specification).

The Contractor shall provide two copies of the shop drawings for precast concrete work to the Engineer for approval 14 days prior to manufacture.

REV.	DATE	AMENDMENT	BY
A	22/01/08	CONSTRUCTION ISSUE	GPW
3	31/05/07	CONSENT ISSUE	GPW
2	31/01/07	TENDER ISSUE	GPW
1	21/12/06	FOR CLIENT REVIEW	GPW

ARCHITECT:



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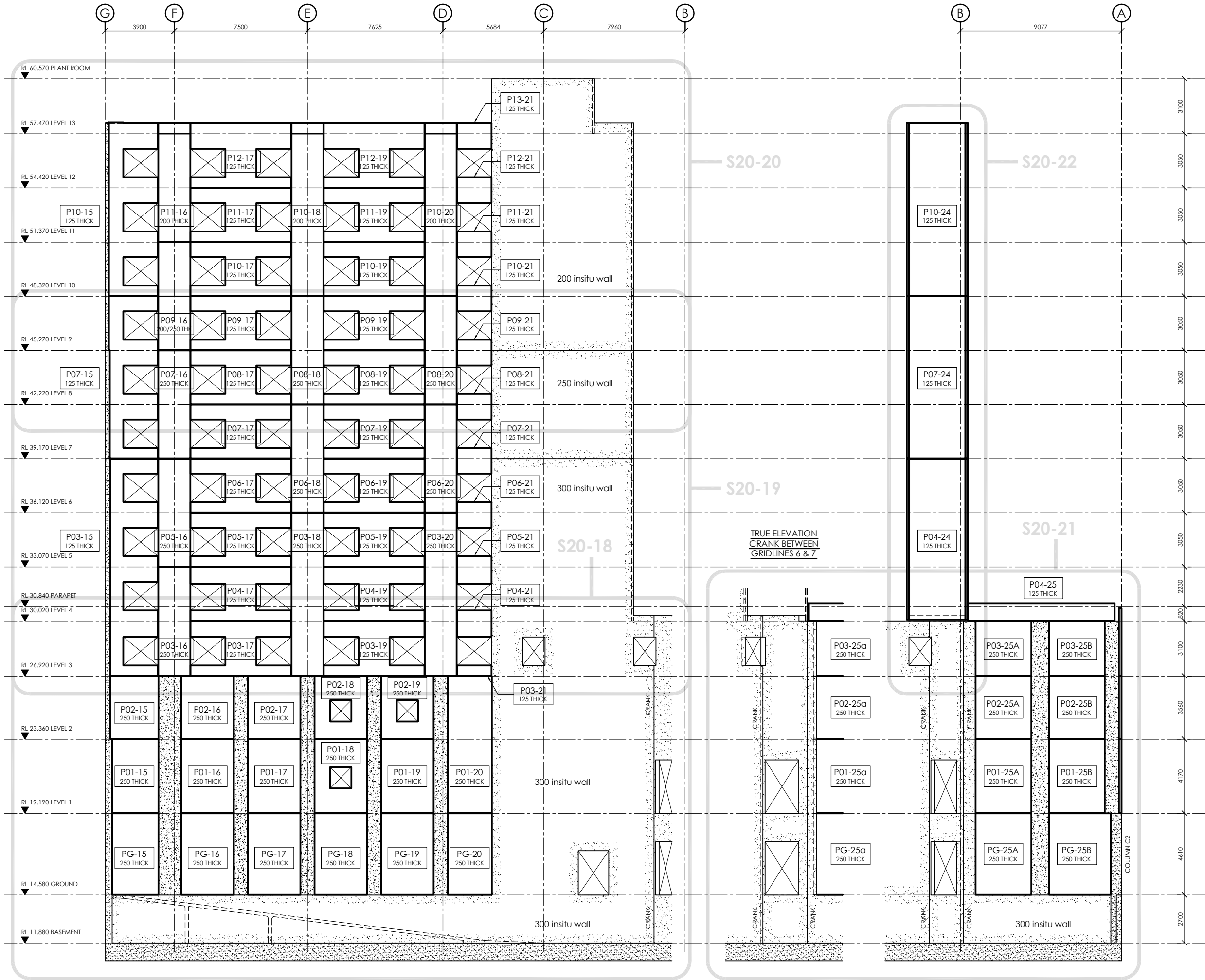
WARNERS NOVOTEL  
CHRISTCHURCH

DRAWING TITLE:

GENERAL ARRANGEMENT  
PRECAST PANEL/  
WALL ELEVATIONS  
GRIDLINES 7, 6 & CRANK

DRAWN: GPW	SCALE:	
ENGINEER: AJW	1:100 @ A1	
CHECKED: CBL	1:200 @ A3	
FILE: 106019	DRAWING NO. S20-3	REV. A

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CONTRACTOR TO VERIFY ALL DIMENSIONS ON SITE  
REFER TO ARCHITECT'S DRAWING FOR ALL SETOUTS

NOTES:

Refer notes sheet at the start of drawing set for notes typically

Refer Architects drawings for all set out dimensions, opening sizes, slab set downs, rebates, sealants etc.

Refer S21 series for typical details of 125mm thick precast panels

Refer S22 series for typical details of insitu walls and structural precast panels greater than 125mm thick

REINFORCING BAR LAPS		
Bar size	Lap length concrete	Lap length concrete block
D12	500 mm	500 mm
D16	650 mm	650 mm
D20	800 mm	800 mm
D25	1000 mm	1000 mm
D32	1300 mm	1300 mm
XD12	700 mm	850 mm
XD16	800 mm	1100 mm
XD20	1000 mm	1400 mm
XD25	1250 mm	1750 mm
XD32	1600 mm	2250 mm

Typically all insitu concrete wall elements to be 30 MPa concrete unless noted otherwise.

Typically all precast concrete and precast beams to be 35 MPa concrete unless noted otherwise.

Unless shown otherwise all horizontal and vertical precast panel joints to be 15mm.

All insitu interfaces and construction joints shall be thoroughly roughened to 5mm amplitude.

All precast to insitu interfaces and grouted joints shall be thoroughly roughened to 5mm amplitude.

Typically horizontal bars in double reinforced panels are to be outside vertical reinforcing 35mm cover to outside bars typical

The lifting and transporting etc., of all panels is the responsibility of the Contractor, this includes the provision of strong backs as required (refer Specification).

The Contractor shall provide two copies of the shop drawings for precast concrete work to the Engineer for approval 14 days prior to manufacture.

A	22/01/08	CONSTRUCTION ISSUE	GPW
3	31/05/07	CONSENT ISSUE	GPW
2	31/01/07	TENDER ISSUE	GPW
1	21/12/06	FOR CLIENT REVIEW	GPW
REV.	DATE	AMENDMENT	BY

ARCHITECT:



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CONSULTING ENGINEERS

PROJECT:

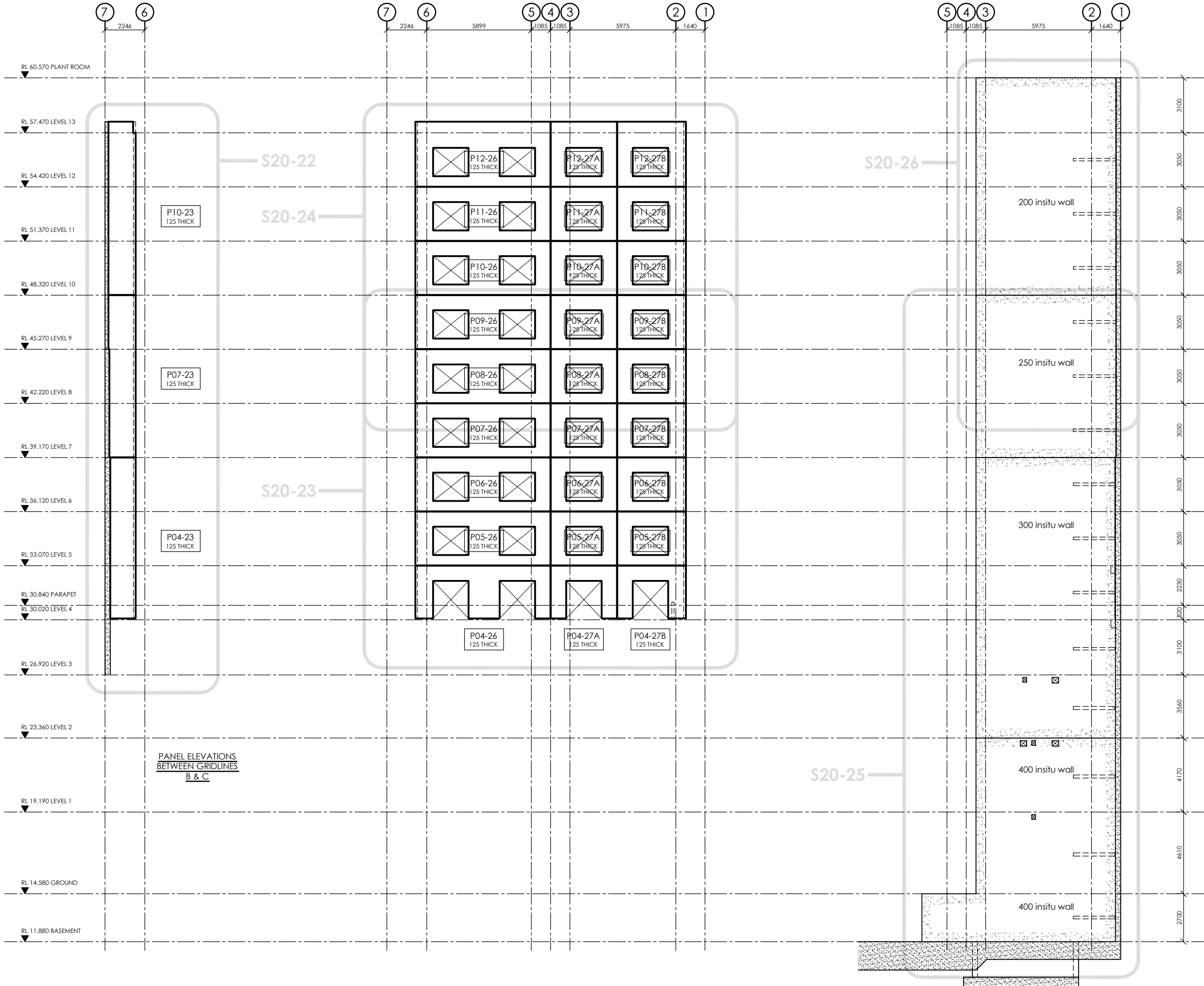
WARNERS NOVOTEL  
CHRISTCHURCH

DRAWING TITLE:

GENERAL ARRANGEMENT  
PRECAST PANEL/  
WALL ELEVATIONS  
GRIDLINES B & D

DRAWN:	GPW	SCALE:	1:100 @ A1
ENGINEER:	AJW		1:200 @ A3
CHECKED:	CBL		
FILE:	106019	DRAWING NO.	S20-4
		REV.	A

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NOTES :

Refer notes sheet at the start of drawing set for notes typically

Refer Architects drawings for all set out dimensions, opening sizes, slab set downs, rebates, sealants etc.

Refer S21 series for typical details of 125mm thick precast panels

Refer S22 series for typical details of  
insitu walls and structural precast panels  
greater than 125mm thick

REINFORCING BAR LAPS		
Bar size	Lap length concrete	Lap length concrete block
D12	500 mm	500 mm
D16	650 mm	650 mm
D20	800 mm	800 mm
D25	1000 mm	1000 mm
D32	1300 mm	1300 mm
XD12	700 mm	850 mm
XD16	800 mm	1100 mm
XD20	1000 mm	1400 mm
XD25	1250 mm	1750 mm
XD32	1600 mm	2250 mm

Typically all insitu concrete wall elements to be 30 MPa concrete unless noted otherwise.

Typically all precast concrete and precast beams to be 35 MPa concrete unless noted otherwise.

Unless shown otherwise all horizontal and vertical precast panel joints to be 15mm.

All insitu interfaces and construction joints shall be thoroughly roughened to 5mm amplitude.

All precast to insitu interfaces and grouted joints shall be thoroughly roughened to 5mm amplitude.

Typically horizontal bars in double reinforced panels are to be outside vertical reinforcing  
35mm cover to outside bars typical

The lifting and transporting etc. of all panels is the responsibility of the Contractor, this includes the provision of strong backs as required (refer Specification).

The Contractor shall provide two copies of the shop drawings for precast concrete work to the Engineer for approval 14 days prior to manufacture.

A	22/01/08	CONSTRUCTION ISSUE	GPW
4	31/05/07	CONSENT ISSUE	GPW
3	22/03/07	TENDER UPDATE ISSUE	GPW
2	31/01/07	TENDER ISSUE	GPW
1	21/12/06	FOR CLIENT REVIEW	GPW
REV.	DATE	AMENDMENT	BY

ARCHITECT:



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CONSULTING ENGINEERS

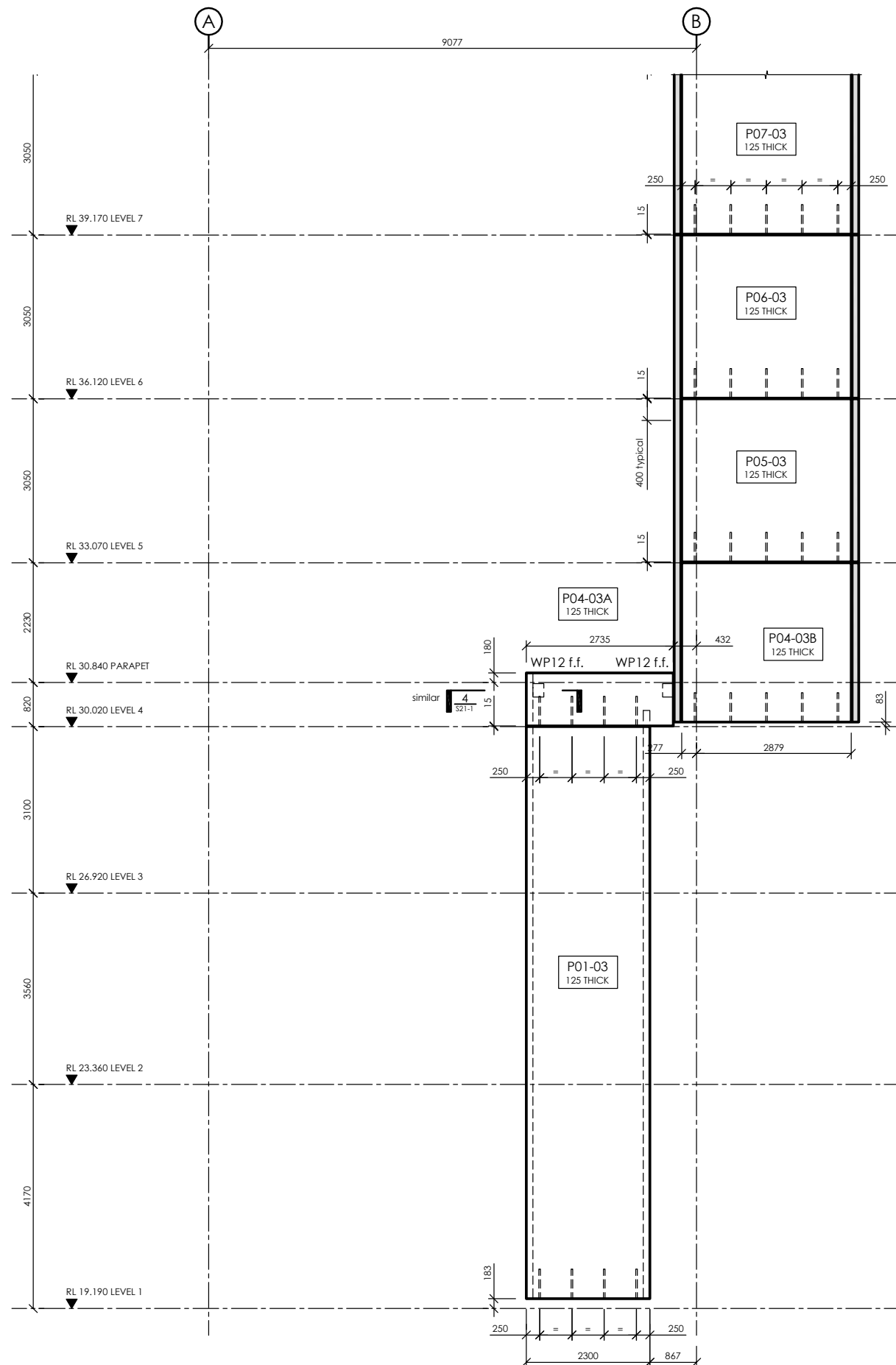
PROJECT:

WARNERS NOVOTEL  
CHRISTCHURCH

DRAWING TITLE:

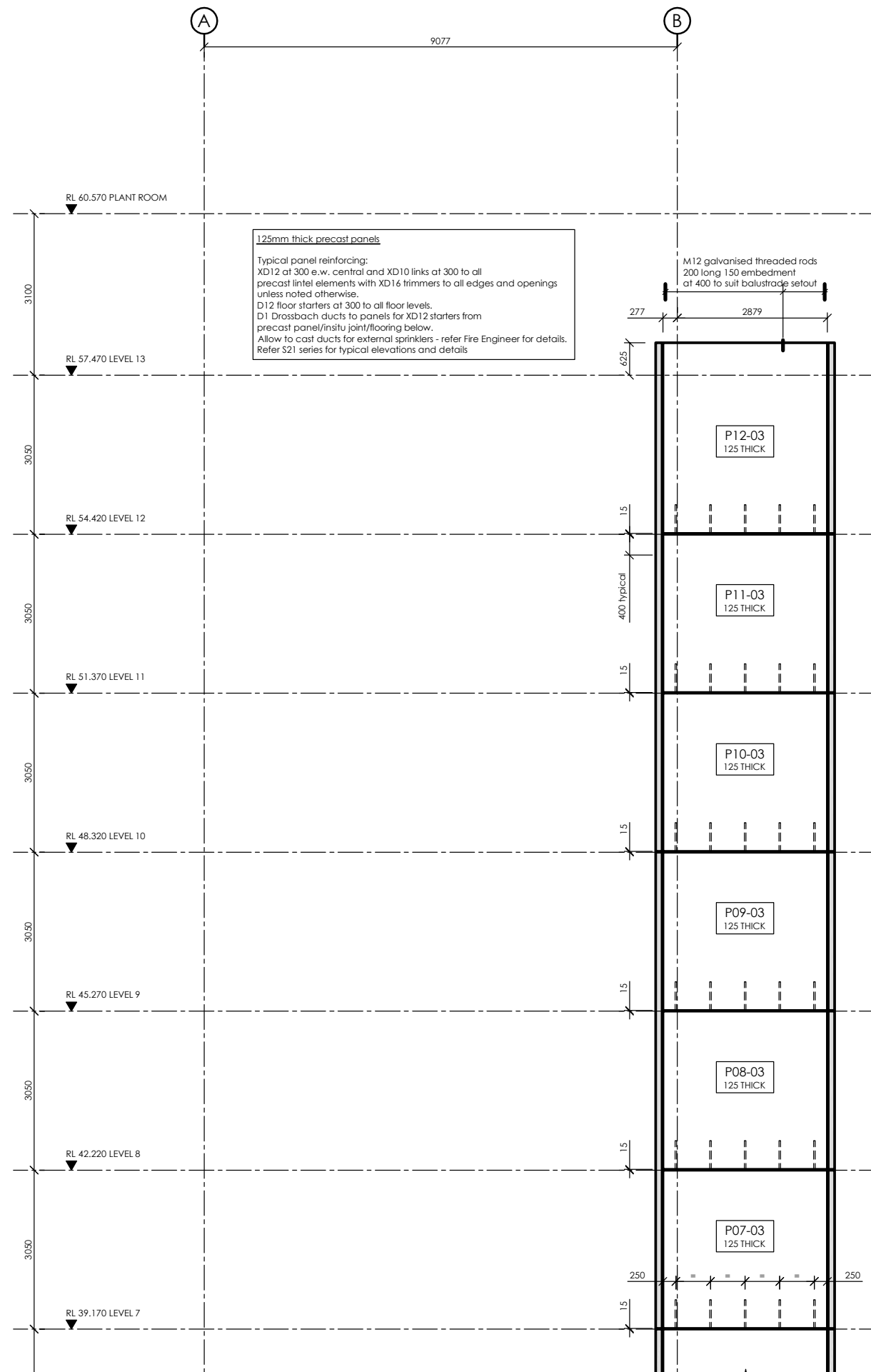
PRECAST PANEL ELEVATION  
NEAR Gridline 2

DRAWN: <b>GPW</b>	SCALE:  1:50 @ A1  1:100 @ A3	
ENGINEER: <b>AJW</b>		
CHECKED: <b>CBL</b>		
FILE: <b>106019</b>	DRAWING NO. <b>S20-10</b>	REV. <b>A</b>



PRECAST PANEL ELEVATION NEAR Gridline 2

1:50





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NOTES:

Refer notes sheet at the start of drawing set for notes typically

Refer Architects drawings for all set out dimensions, opening sizes, slab set downs, rebates, sealants etc.

Refer S21 series for typical details of 125mm thick precast panels

Refer S22 series for typical details of insitu walls and structural precast panels greater than 125mm thick

REINFORCING BAR LAPS		
Bar size	Lap length concrete	Lap length concrete block
D12	500 mm	500 mm
D16	650 mm	650 mm
D20	800 mm	800 mm
D25	1000 mm	1000 mm
D32	1300 mm	1300 mm
XD12	700 mm	850 mm
XD16	800 mm	1100 mm
XD20	1000 mm	1400 mm
XD25	1250 mm	1750 mm
XD32	1600 mm	2250 mm

Typically all insitu concrete wall elements to be 30 MPa concrete unless noted otherwise.

Typically all precast concrete and precast beams to be 35 MPa concrete unless noted otherwise.

Unless shown otherwise all horizontal and vertical precast panel joints to be 15mm.

All insitu interfaces and construction joints shall be thoroughly roughened to 5mm amplitude.

All precast to insitu interfaces and grouted joints shall be thoroughly roughened to 5mm amplitude.

Typically horizontal bars in double reinforced panels are to be outside vertical reinforcing 35mm cover to outside bars typical

The lifting and transporting etc., of all panels is the responsibility of the Contractor, this includes the provision of strong backs as required (refer Specification).

The Contractor shall provide two copies of the shop drawings for precast concrete work to the Engineer for approval 14 days prior to manufacture.

REV.	DATE	AMENDMENT	BY
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2	31/01/07	TENDER ISSUE	GPW
1	21/12/06	FOR CLIENT REVIEW	GPW

ARCHITECT:



lewis bradford  
CONSULTING ENGINEERS

PROJECT:

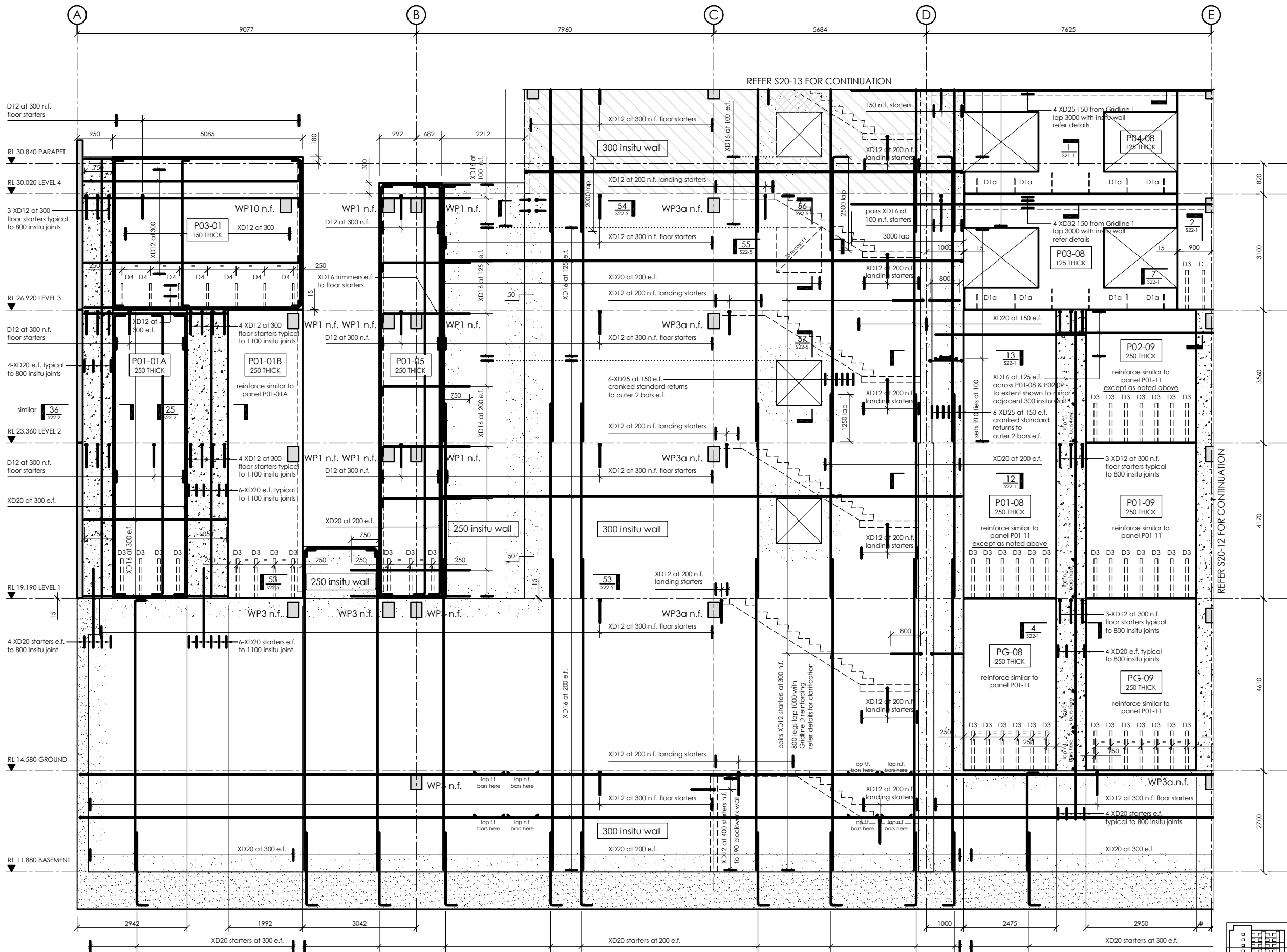
WARNERS NOVOTEL  
CHRISTCHURCH

DRAWING TITLE:

PRECAST PANEL/  
WALL ELEVATION  
Gridline 1  
SHEET 1 OF 4

DRAWN: GPW	SCALE: 1:50 @ A1	REV. A
ENGINEER: AJW	1:100 @ A3	
CHECKED: CBL		
FILE: 106019	DRAWING NO. S20-11	

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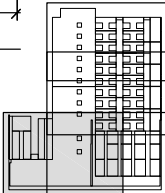


PRECAST PANEL/WALL ELEVATION Gridline 1

1:50

lap locations shown are indicative only.  
all lap locations shall be confirmed with  
Engineer and to suit Contractor preferences  
prior to fabrication, generally n.f. & f.f. laps  
shall be staggered by a full lap length u.n.o.

KEY PLAN



THIS DRAWING AND ALL INFORMATION CONTAINED WITHIN IS THE PROPERTY OF LEWIS BRADFORD. ITS CONTENTS ARE CONFIDENTIAL AND MUST NOT BE REPRODUCED OR DISTRIBUTED TO ANY OTHER PERSON OR COMPANY UNLESS AGREED TO IN WRITING BY LEWIS BRADFORD

CONTRACTOR TO VERIFY ALL DIMENSIONS ON SITE  
REFER TO ARCHITECT'S DRAWING FOR ALL SETOUTS

NOTES:

Refer notes sheet at the start of drawing set for notes typically

Refer Architects drawings for all set out dimensions, opening sizes, slab set downs, rebates, sealants etc.

Refer S21 series for typical details of 125mm thick precast panels

Refer S22 series for typical details of insitu walls and structural precast panels greater than 125mm thick

REINFORCING BAR LAPS		
Bar size	Lap length concrete	Lap length concrete block
D12	500 mm	500 mm
D16	650 mm	650 mm
D20	800 mm	800 mm
D25	1000 mm	1000 mm
D32	1300 mm	1300 mm
XD12	700 mm	850 mm
XD16	800 mm	1100 mm
XD20	1000 mm	1400 mm
XD25	1250 mm	1750 mm
XD32	1600 mm	2250 mm

Typically all insitu concrete wall elements to be 30 MPa concrete unless noted otherwise.

Typically all precast concrete and precast beams to be 35 MPa concrete unless noted otherwise.

Unless shown otherwise all horizontal and vertical precast panel joints to be 15mm.

All insitu interfaces and construction joints shall be thoroughly roughened to 5mm amplitude.

All precast to insitu interfaces and grouted joints shall be thoroughly roughened to 5mm amplitude.

Typically horizontal bars in double reinforced panels are to be outside vertical reinforcing 35mm cover to outside bars typical

The lifting and transporting etc., of all panels is the responsibility of the Contractor, this includes the provision of strong backs as required (refer Specification).

The Contractor shall provide two copies of the shop drawings for precast concrete work to the Engineer for approval 14 days prior to manufacture.

REV.	DATE	AMENDMENT	BY
A	22/01/08	CONSTRUCTION ISSUE	GPW
4	31/05/07	CONSENT ISSUE	GPW
3	22/03/07	TENDER UPDATE ISSUE	GPW
2	31/01/07	TENDER ISSUE	GPW
1	21/12/06	FOR CLIENT REVIEW	GPW

ARCHITECT:



lewis bradford  
CONSULTING ENGINEERS

PROJECT:

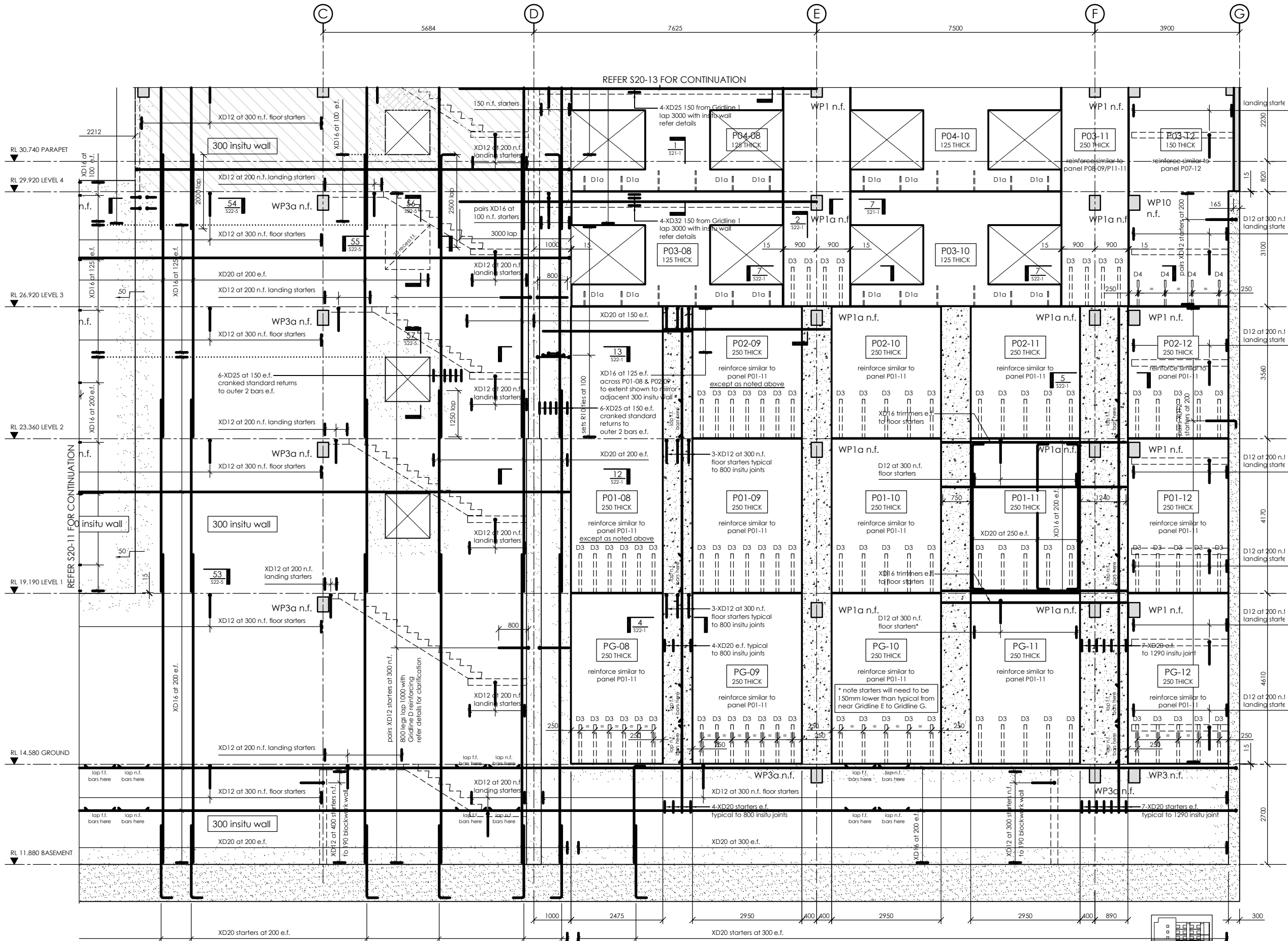
WARNERS NOVOTEL  
CHRISTCHURCH

DRAWING TITLE:

PRECAST PANEL/  
WALL ELEVATION  
Gridline 1  
SHEET 2 OF 4

DRAWN: GPW	SCALE: 1:50 @ A1	REV. A
ENGINEER: AJW	1:100 @ A3	
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FILE: 106019	DRAWING NO. S20-12	

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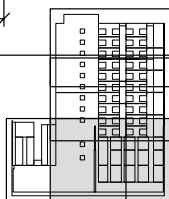


PRECAST PANEL/WALL ELEVATION Gridline 1

1:50

lap locations shown are indicative only.  
all lap locations shall be confirmed with  
Engineer and to suit Contractor preferences  
prior to fabrication, generally n.f. & f.f. laps  
shall be staggered by a full lap length u.n.o.

KEY PLAN



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CONTRACTOR TO VERIFY ALL DIMENSIONS ON SITE REFER TO ARCHITECT'S DRAWING FOR ALL SETOUTS

NOTES:

Refer notes sheet at the start of drawing set for notes typically

Refer Architects drawings for all set out dimensions, opening sizes, slab set downs, rebates, sealants etc.

Refer S21 series for typical details of 125mm thick precast panels

Refer S22 series for typical details of insitu walls and structural precast panels greater than 125mm thick

REINFORCING BAR LAPS		
Bar size	Lap length concrete	Lap length concrete block
D12	500 mm	500 mm
D16	650 mm	650 mm
D20	800 mm	800 mm
D25	1000 mm	1000 mm
D32	1300 mm	1300 mm
XD12	700 mm	850 mm
XD16	800 mm	1100 mm
XD20	1000 mm	1400 mm
XD25	1250 mm	1750 mm
XD32	1600 mm	2250 mm

Typically all insitu concrete wall elements to be 30 MPa concrete unless noted otherwise.

Typically all precast concrete and precast beams to be 35 MPa concrete unless noted otherwise.

Unless shown otherwise all horizontal and vertical precast panel joints to be 15mm.

All insitu interfaces and construction joints shall be thoroughly roughened to 5mm amplitude.

All precast to insitu interfaces and grouted joints shall be thoroughly roughened to 5mm amplitude.

Typically horizontal bars in double reinforced panels are to be outside vertical reinforcing 35mm cover to outside bars typical

The lifting and transporting etc. of all panels is the responsibility of the Contractor, this includes the provision of strong backs as required (refer Specification).

The Contractor shall provide two copies of the shop drawings for precast concrete work to the Engineer for approval 14 days prior to manufacture.

REV.	DATE	AMENDMENT	BY
A	22/01/08	CONSTRUCTION ISSUE	GPW
4	31/05/07	CONSENT ISSUE	GPW
3	22/03/07	TENDER UPDATE ISSUE	GPW
2	31/01/07	TENDER ISSUE	GPW
1	21/12/06	FOR CLIENT REVIEW	GPW

ARCHITECT:



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CONSULTING ENGINEERS

PROJECT:

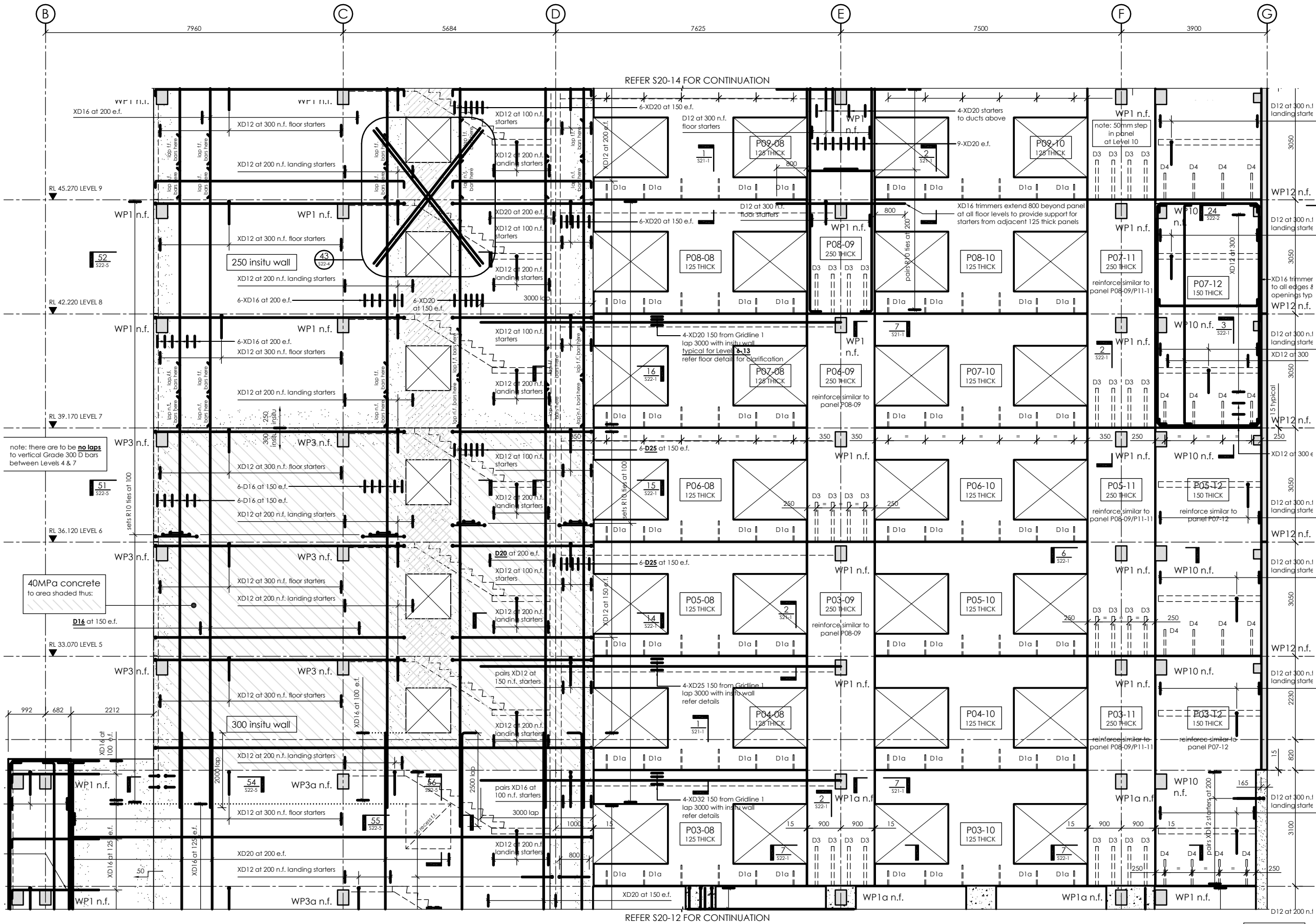
WARNERS NOVOTEL  
CHRISTCHURCH

DRAWING TITLE:

PRECAST PANEL/  
WALL ELEVATION  
Gridline 1  
SHEET 3 OF 4

DRAWN: GPW	SCALE: 1:50 @ A1	REV. A
ENGINEER: AJW	1:100 @ A3	
CHECKED: CBL		
FILE: 106019	DRAWING NO. S20-13	

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REFER S20-14 FOR CONTINUATION

REFER S20-12 FOR CONTINUATION

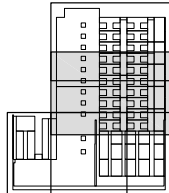
PRECAST PANEL/WALL ELEVATION Gridline 1

1:50

125mm thick precast panels

Typical panel reinforcing:  
XD12 at 300 e.w. central and XD10 links at 300 to all precast lintel elements with XD16 trimmers to all edges and openings unless noted otherwise.  
D12 floor starters at 300 to all floor levels.  
D1 Drossbach ducts to panels for XD12 starters from precast panel/insitu joint/flooring below.  
Allow to cast ducts for external sprinklers - refer Fire Engineer for details.  
Refer S21 series for typical elevations and details

KEY PLAN





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CONTRACTOR TO VERIFY ALL DIMENSIONS ON SITE REFER TO ARCHITECT'S DRAWING FOR ALL SETOUTS

NOTES:

Refer notes sheet at the start of drawing set for notes typically

Refer Architects drawings for all set out dimensions, opening sizes, slab set downs, rebates, sealants etc.

Refer S21 series for typical details of 125mm thick precast panels

Refer S22 series for typical details of insitu walls and structural precast panels greater than 125mm thick

REINFORCING BAR LAPS		
Bar size	Lap length concrete	Lap length concrete block
D12	500 mm	500 mm
D16	650 mm	650 mm
D20	800 mm	800 mm
D25	1000 mm	1000 mm
D32	1300 mm	1300 mm
XD12	700 mm	850 mm
XD16	800 mm	1100 mm
XD20	1000 mm	1400 mm
XD25	1250 mm	1750 mm
XD32	1600 mm	2250 mm

Typically all insitu concrete wall elements to be 30 MPa concrete unless noted otherwise.

Typically all precast concrete and precast beams to be 35 MPa concrete unless noted otherwise.

Unless shown otherwise all horizontal and vertical precast panel joints to be 15mm.

All insitu interfaces and construction joints shall be thoroughly roughened to 5mm amplitude.

All precast to insitu interfaces and grouted joints shall be thoroughly roughened to 5mm amplitude.

Typically horizontal bars in double reinforced panels are to be outside vertical reinforcing 35mm cover to outside bars typical

The lifting and transporting etc., of all panels is the responsibility of the Contractor, this includes the provision of strong backs as required (refer Specification).

The Contractor shall provide two copies of the shop drawings for precast concrete work to the Engineer for approval 14 days prior to manufacture.

REV.	DATE	AMENDMENT	BY
A	22/01/08	CONSTRUCTION ISSUE	GPW
4	31/05/07	CONSENT ISSUE	GPW
3	22/03/07	TENDER UPDATE ISSUE	GPW
2	31/01/07	TENDER ISSUE	GPW
1	21/12/06	FOR CLIENT REVIEW	GPW

ARCHITECT:



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CONSULTING ENGINEERS

PROJECT:

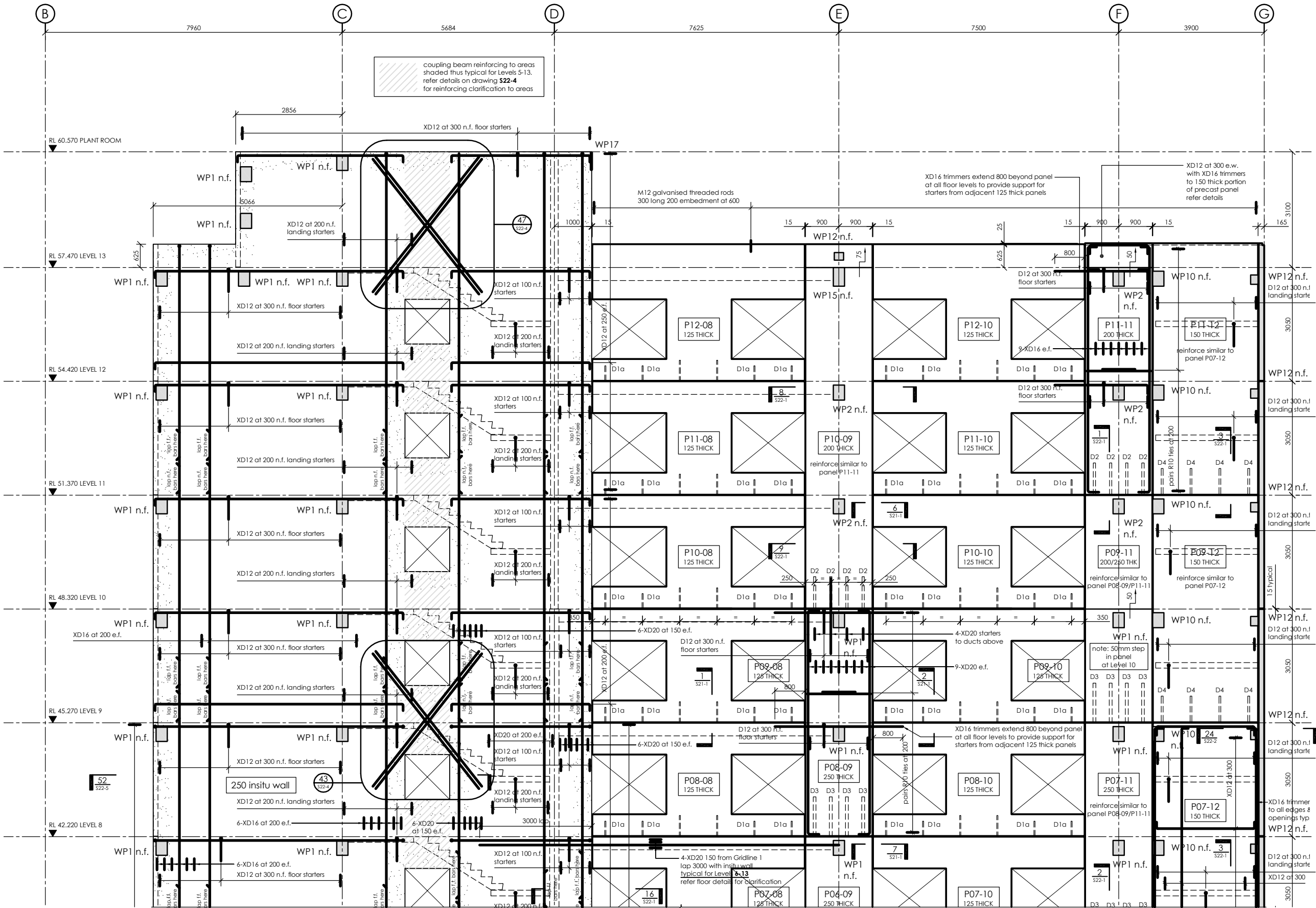
WARNERS NOVOTEL  
CHRISTCHURCH

DRAWING TITLE:

PRECAST PANEL/  
WALL ELEVATION  
Gridline 1  
SHEET 4 OF 4

DRAWN: GPW	SCALE: 1:50 @ A1	REV. A
ENGINEER: AJW	1:100 @ A3	
CHECKED: CBL		
FILE: 106019	DRAWING NO. S20-14	

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REFER S20-13 FOR CONTINUATION

PRECAST PANEL/WALL ELEVATION Gridline 1

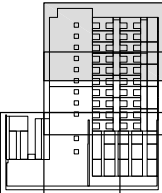
1:50

lap locations shown are indicative only, all lap locations shall be confirmed with Engineer and to suit Contractor preferences prior to fabrication, generally n.f. & f.f. laps shall be staggered by a full lap length u.n.o.

125mm thick precast panels

Typical panel reinforcing:  
XD12 at 300 e.w. central and XD10 links at 300 to all precast lintel elements with XD16 trimmers to all edges and openings unless noted otherwise.  
D12 floor starters at 300 to all floor levels.  
D1 Drossbach ducts to panels for XD12 starters from precast panel/insitu joint/flooring below.  
Allow to cast ducts for external sprinklers - refer Fire Engineer for details.  
Refer S21 series for typical elevations and details

KEY PLAN



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CONTRACTOR TO VERIFY ALL DIMENSIONS ON SITE  
REFER TO ARCHITECT'S DRAWING FOR ALL SETOUTS

NOTES :

Refer notes sheet at the start of drawing set for notes typically

Refer Architects drawings for all set out dimensions, opening sizes, slab set downs, rebates, sealants etc.

Refer S21 series for typical details of  
125mm thick precast panels

Refer S22 series for typical details of  
insitu walls and structural precast panels  
greater than 125mm thick

REINFORCING BAR LAPS		
Bar size	Lap length concrete	Lap length concrete bl
D12	500 mm	500 mm
D16	650 mm	650 mm
D20	800 mm	800 mm
D25	1000 mm	1000 mm
D32	1300 mm	1300 mm
XD12	700 mm	850 mm
XD16	800 mm	1100 mm
XD20	1000 mm	1400 mm
XD25	1250 mm	1750 mm
XD32	1600 mm	2250 mm

Typically all insitu concrete wall elements to be 30 MPa concrete unless noted otherwise.

Typically all precast concrete and precast beams to be 35 MPa concrete unless noted otherwise.

Unless shown otherwise all horizontal and vertical precast panel joints to be 15mm.

All insitu interfaces and construction joints shall be thoroughly roughened to 5mm amplitude.

All precast to insitu interfaces and grouted joints shall be thoroughly roughened to 5mm amplitude.

Typically horizontal bars in double reinforced panels are to be outside vertical reinforcing

The lifting and transporting etc. of all panels is the responsibility of the Contractor, this includes the provision of strong backs as required (refer Specification).

The Contractor shall provide two copies of the shop drawings for precast concrete work to the Engineer for approval 14 days prior to manufacture.

A	22/01/08	CONSTRUCTION ISSUE	GPW	
4	31/05/07	CONSENT ISSUE	GPW	
3	22/03/07	TENDER UPDATE ISSUE	GPW	
2	31/01/07	TENDER ISSUE	GPW	
1	21/12/06	FOR CLIENT REVIEW	GPW	
REV.	DATE	AMENDMENT	BY	

ARCHITECT:



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CONSULTING ENGINEERS

PROJECT:

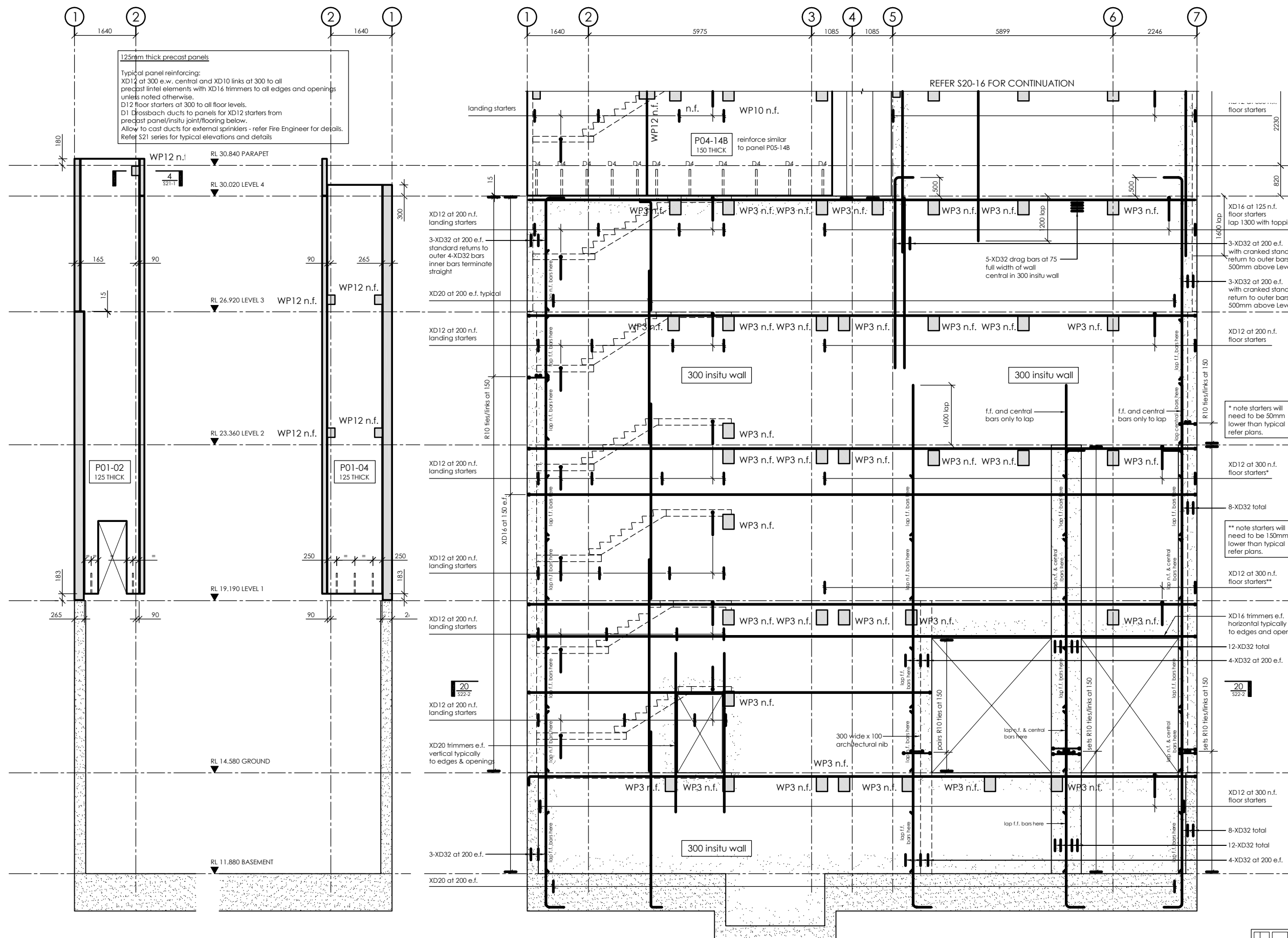
WARNERS NOVOTEL  
CHRISTCHURCH

DRAWING TITLE:

PRECAST PANEL/  
WALL ELEVATION  
Gridline G  
SHEET 1 OF 3

DRAWN: GPW		SCALE:  1:50 @ A1  1:100 @ A3	
ENGINEER: AJW			
CHECKED: CBL			
FILE:  106019	DRAWING NO.  S20-15	REV.  A	

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### PRECAST PANEL ELEVATION BETWEEN Gridlines A & B

1.50

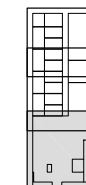
PRECAST PANEL ELEVATION NEAR Gridline B

1:50

lap locations shown are indicative only.  
all lap locations shall be confirmed with  
Engineer and to suit Contractor preferences  
prior to fabrication. generally n.f. & f.f. laps  
shall be staggered by a full lap length u.n.o.

PRECAST PANEL/WALL ELEVATION Gridline G

1:50



### KEY PLAN

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CONTRACTOR TO VERIFY ALL DIMENSIONS ON SITE  
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NOTES:

Refer notes sheet at the start of drawing set for notes typically

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Refer S21 series for typical details of 125mm thick precast panels

Refer S22 series for typical details of insitu walls and structural precast panels greater than 125mm thick

REINFORCING BAR LAPS		
Bar size	Lap length concrete	Lap length concrete block
D12	500 mm	500 mm
D16	650 mm	650 mm
D20	800 mm	800 mm
D25	1000 mm	1000 mm
D32	1300 mm	1300 mm
XD12	700 mm	850 mm
XD16	800 mm	1100 mm
XD20	1000 mm	1400 mm
XD25	1250 mm	1750 mm
XD32	1600 mm	2250 mm

Typically all insitu concrete wall elements to be 30 MPa concrete unless noted otherwise.

Typically all precast concrete and precast beams to be 35 MPa concrete unless noted otherwise.

Unless shown otherwise all horizontal and vertical precast panel joints to be 15mm.

All insitu interfaces and construction joints shall be thoroughly roughened to 5mm amplitude.

All precast to insitu interfaces and grouted joints shall be thoroughly roughened to 5mm amplitude.

Typically horizontal bars in double reinforced panels are to be outside vertical reinforcing 35mm cover to outside bars typical

The lifting and transporting etc., of all panels is the responsibility of the Contractor, this includes the provision of strong backs as required (refer Specification).

The Contractor shall provide two copies of the shop drawings for precast concrete work to the Engineer for approval 14 days prior to manufacture.

REV.	DATE	AMENDMENT	BY
A	22/01/08	CONSTRUCTION ISSUE	GPW
4	31/05/07	CONSENT ISSUE	GPW
3	22/03/07	TENDER UPDATE ISSUE	GPW
2	31/01/07	TENDER ISSUE	GPW
1	21/12/06	FOR CLIENT REVIEW	GPW

ARCHITECT:



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CONSULTING ENGINEERS

PROJECT:

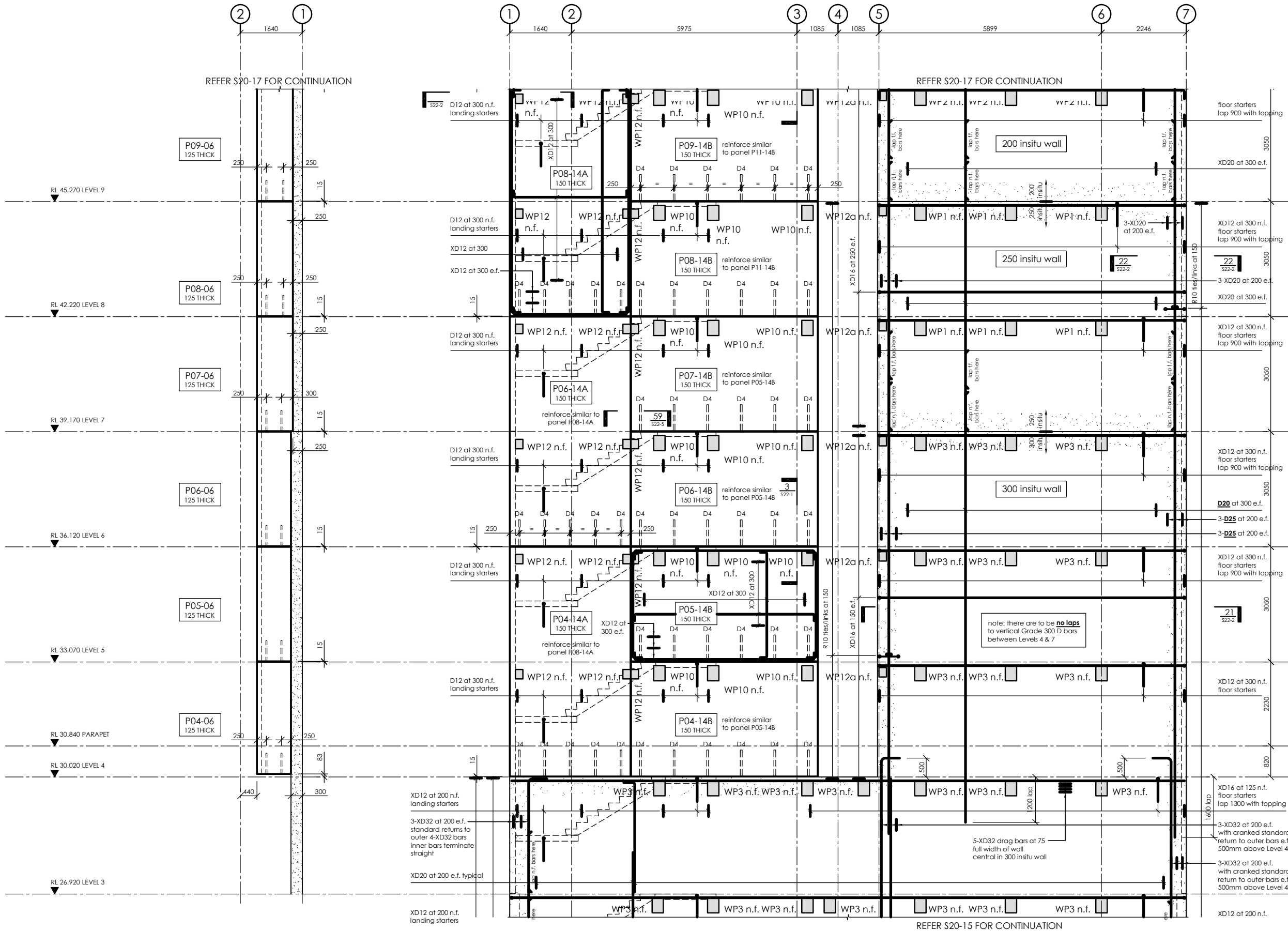
WARNERS NOVOTEL  
CHRISTCHURCH

DRAWING TITLE:

PRECAST PANEL/  
WALL ELEVATION  
Gridline G  
SHEET 2 OF 3

DRAWN: GPW	SCALE: 1:50 @ A1	REV. A
ENGINEER: AJW	1:100 @ A3	
CHECKED: CBL		
FILE: 106019	DRAWING NO. S20-16	

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PRECAST PANEL ELEVATION BETWEEN Gridlines B & C

1:50

125mm thick precast panels

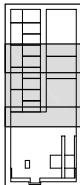
Typical panel reinforcing:  
XD12 at 300 e.w. central and XD10 links at 300 to all precast lintel elements with XD16 trimmers to all edges and openings unless noted otherwise.  
D12 floor starters at 300 to all floor levels.  
D1 Drossbach ducts to panels for XD12 starters from precast panel/insitu joint/flooring below.  
Allow to cast ducts for external sprinklers - refer Fire Engineer for details.  
Refer S21 series for typical elevations and details

PRECAST PANEL/WALL ELEVATION Gridline G

1:50

lap locations shown are indicative only, all lap locations shall be confirmed with Engineer and to suit Contractor preferences prior to fabrication, generally n.f. & f.f. laps shall be staggered by a full lap length u.n.o.

KEY PLAN





CONTRACTOR TO VERIFY ALL DIMENSIONS ON SITE  
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NOTES :

Refer notes sheet at the start of drawing set for notes typically

Refer Architects drawings for all set out dimensions, opening sizes, slab set downs, rebates, sealants etc.

Refer S21 series for typical details of  
125mm thick precast panels

Refer S22 series for typical details of  
insitu walls and structural precast panels  
greater than 125mm thick

REINFORCING BAR LAPS		
Bar size	Lap length concrete	Lap length concrete block
D12	500 mm	500 mm
D16	650 mm	650 mm
D20	800 mm	800 mm
D25	1000 mm	1000 mm
D32	1300 mm	1300 mm
XD12	700 mm	850 mm
XD16	800 mm	1100 mm
XD20	1000 mm	1400 mm
XD25	1250 mm	1750 mm
XD32	1600 mm	2250 mm

Typically all insitu concrete wall elements to be 30 MPa concrete unless noted otherwise.

Typically all precast concrete and precast beams to be 35 MPa concrete unless noted otherwise.

Unless shown otherwise all horizontal and vertical precast panel joints to be 15mm.

All insitu interfaces and construction joints shall be thoroughly roughened to 5mm amplitude.

All precast to insitu interfaces and grouted joints shall be thoroughly roughened to 5mm amplitude.

Typically horizontal bars in double reinforced panels are to be outside vertical reinforcing  
35mm cover to outside bars typical

The lifting and transporting etc. of all panels is the responsibility of the Contractor, this includes the provision of strong backs as required (refer Specification).

The Contractor shall provide two copies of the shop drawings for precast concrete work to the Engineer for approval 14 days prior to manufacture.

A	22/01/08	CONSTRUCTION ISSUE	GPW
4	31/05/07	CONSENT ISSUE	GPW
3	22/03/07	TENDER UPDATE ISSUE	GPW
2	31/01/07	TENDER ISSUE	GPW
1	21/12/06	FOR CLIENT REVIEW	GPW
REV.	DATE	AMENDMENT	BY

ARCHITECT:



**lewis bradford**  
CONSULTING ENGINEERS

PROJECT:

WARNERS NOVOTEL  
CHRISTCHURCH

RAWING TITLE:

PRECAST PANEL/  
WALL ELEVATION  
Gridline G  
SHEET 3 OF 3

DRAWN:	GPW
ENGINEER:	AJW
CHECKED:	CBL

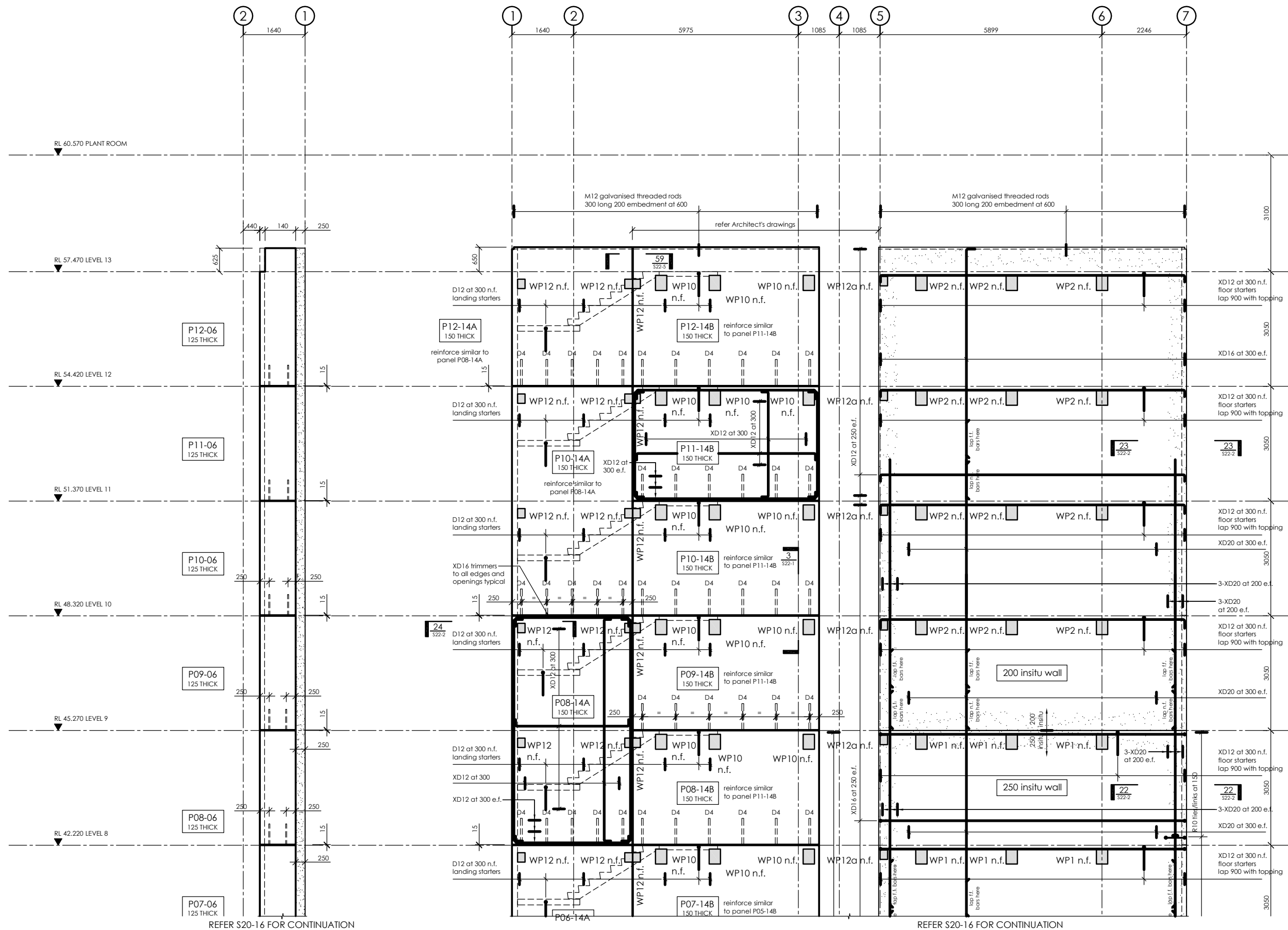
SCALE:

1:50 @ A1

1:100 @ A3

DRAWING NO.	REV.
S20-17	A

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### PRECAST PANEL ELEVATION BETWEEN Gridlines B & C

1:50

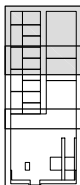
125mm thick precast panels

Typical panel reinforcing:  
XD12 at 300 e.w. central and XD10 links at 300 to all precast lintel elements with XD16 trimmers to all edges and openings unless noted otherwise.  
D12 floor starters at 300 to all floor levels.  
D1 Drossbach ducts to panels for XD12 starters from precast panel/in situ joint/flooring below.  
Allow to cast ducts for external sprinklers - refer Fire Engineer for details.  
Refer S21 series for typical elevations and details

PRECAST PANEL/WALL ELEVATION Gridline G

1:50

lap locations shown are indicative only.  
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Engineer and to suit Contractor preferences  
prior to fabrication. generally n.f. & f.f. laps  
shall be staggered by a full lap length u.n.o.



### KEY PLAN

NOTES :

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Refer Architects drawings for all set out dimensions, opening sizes, slab set downs, rebates, sealants etc.

Refer S21 series for typical details of  
125mm thick precast panels

Refer S22 series for typical details of  
insitu walls and structural precast panels  
greater than 125mm thick

REINFORCING BAR LAPS		
Bar size	Lap length concrete	Lap length concrete bl
D12	500 mm	500 mm
D16	650 mm	650 mm
D20	800 mm	800 mm
D25	1000 mm	1000 mm
D32	1300 mm	1300 mm
XD12	700 mm	850 mm
XD16	800 mm	1100 mm
XD20	1000 mm	1400 mm
XD25	1250 mm	1750 mm
XD32	1600 mm	2250 mm

Typically all insitu concrete wall elements to be 30 MPa concrete unless noted otherwise

Typically all precast concrete and precast beams to be 35 MPa concrete unless noted otherwise.

Unless shown otherwise all horizontal and vertical precast panel joints to be 15mm.

All insitu interfaces and construction joints shall be thoroughly roughened to 5mm amplitude.

All precast to insitu interfaces and grouted joints shall be thoroughly roughened to 5mm amplitude.

Typically horizontal bars in double reinforced panels are to be outside vertical reinforcing  
35mm cover to outside bars typical

The lifting and transporting etc. of all panels is the responsibility of the Contractor, this includes the provision of strong backs as required (refer Specification).

The Contractor shall provide two copies of the shop drawings for precast concrete work to the Engineer for approval 14 days prior to manufacture.

A	22/01/08	CONSTRUCTION ISSUE	CPW	
4	31/05/07	CONSENT ISSUE	CPW	
3	22/03/07	TENDER UPDATE ISSUE	CPW	
2	31/01/07	TENDER ISSUE	CPW	
1	21/12/06	FOR CLIENT REVIEW	CPW	
REV.	DATE	AMENDMENT	BY	

ARCHITECT:



**lewis bradford**  
CONSULTING ENGINEERS

PROJECT:

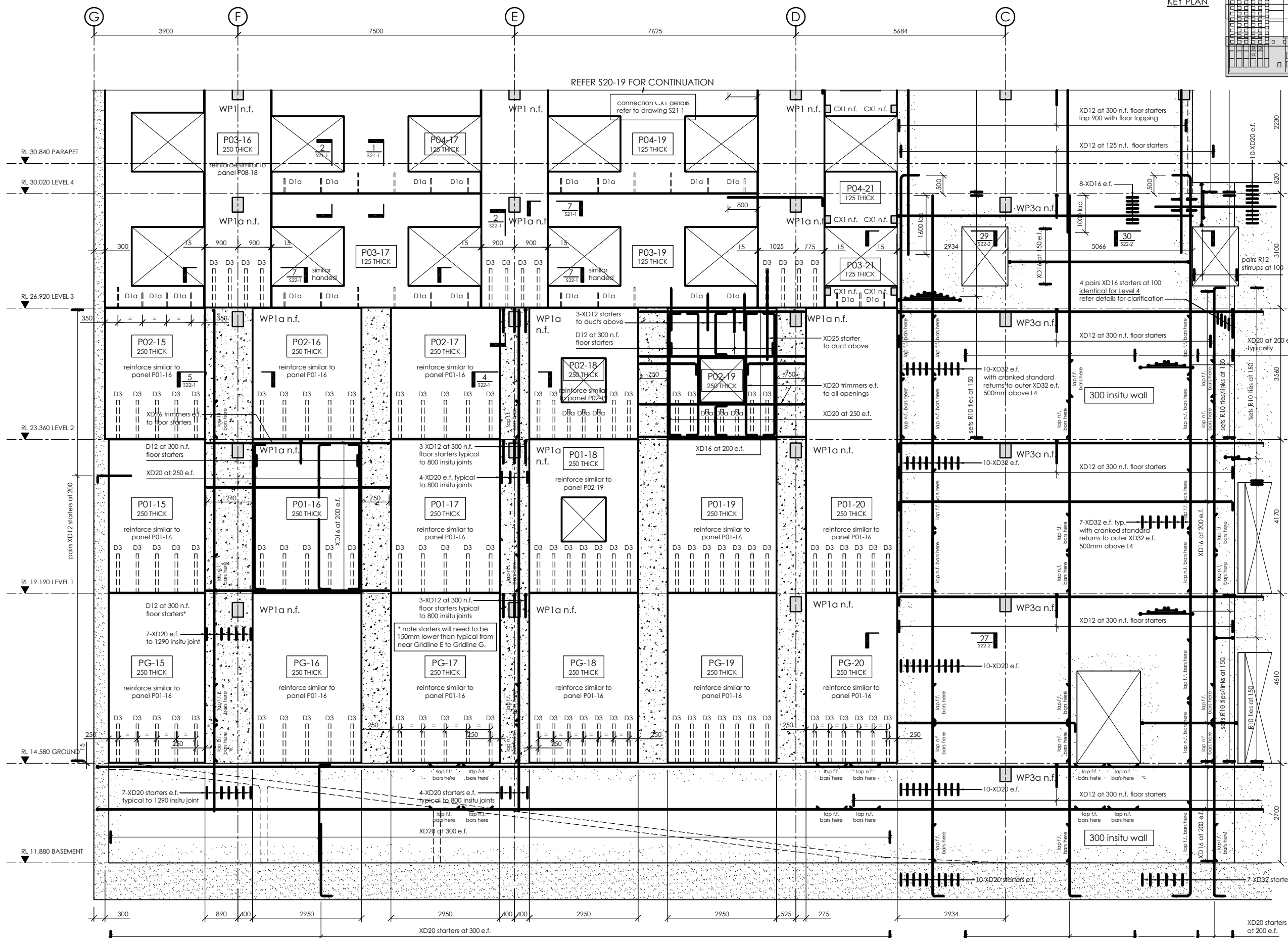
WARNERS NOVOTEL  
CHRISTCHURCH

DRAWING TITLE

PRECAST PANEL/  
WALL ELEVATION  
Gridline 7  
SHEET 1 OF 3

DRAWN: GPW	SCALE:  1:50 @ A1  1:100 @ A3
ENGINEER: AJW	
CHECKED: CBL	
FILE: 106019	DRAWING NO. S20-18

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PRECAST PANEL/WALL ELEVATION Gridline 7

lap locations shown are indicative only.  
all lap locations shall be confirmed with  
Engineer and to suit Contractor preferences  
prior to fabrication, generally n.f. & f.f. laps  
shall be staggered by a full lap length u.n.o.

CONTRACTOR TO VERIFY ALL DIMENSIONS ON SITE  
REFER TO ARCHITECT'S DRAWING FOR ALL SETOUTS

NOTES :

Refer notes sheet at the start of drawing set for notes typically

Refer Architects drawings for all set out dimensions, opening sizes, slab set downs, rebates, sealants etc.

Refer S21 series for typical details of 125mm thick precast panels

Refer S22 series for typical details of  
insitu walls and structural precast panels  
greater than 125mm thick

REINFORCING BAR LAPS		
Bar size	Lap length concrete	Lap length concrete block
D12	500 mm	500 mm
D16	650 mm	650 mm
D20	800 mm	800 mm
D25	1000 mm	1000 mm
D32	1300 mm	1300 mm
XD12	700 mm	850 mm
XD16	800 mm	1100 mm
XD20	1000 mm	1400 mm
XD25	1250 mm	1750 mm
XD32	1600 mm	2250 mm

Typically all insitu concrete wall elements to be 30 MPa concrete unless noted otherwise.

Typically all precast concrete and precast beams to be 35 MPa concrete unless noted otherwise.

Unless shown otherwise all horizontal and vertical precast panel joints to be 15mm.

All insitu interfaces and construction joints shall be thoroughly roughened to 5mm amplitude.

All precast to insitu interfaces and grouted joints shall be thoroughly roughened to 5mm amplitude.

Typically horizontal bars in double reinforced panels are to be outside vertical reinforcing  
35mm cover to outside bars typical

The lifting and transporting etc. of all panels is the responsibility of the Contractor, this includes the provision of strong backs as required (refer Specification).

The Contractor shall provide two copies of the shop drawings for precast concrete work to the Engineer for approval 14 days prior to manufacture.

A	22/01/08	CONSTRUCTION ISSUE	GPW
4	31/05/07	CONSENT ISSUE	GPW
3	22/03/07	TENDER UPDATE ISSUE	GPW
2	31/01/07	TENDER ISSUE	GPW
1	21/12/06	FOR CLIENT REVIEW	GPW
REV.	DATE	AMENDMENT	BY

ARCHITECT:



**lewis bradford**  
CONSULTING ENGINEERS

PROJECT:

WARNERS NOVOTEL  
CHRISTCHURCH

DRAWING TITLE:

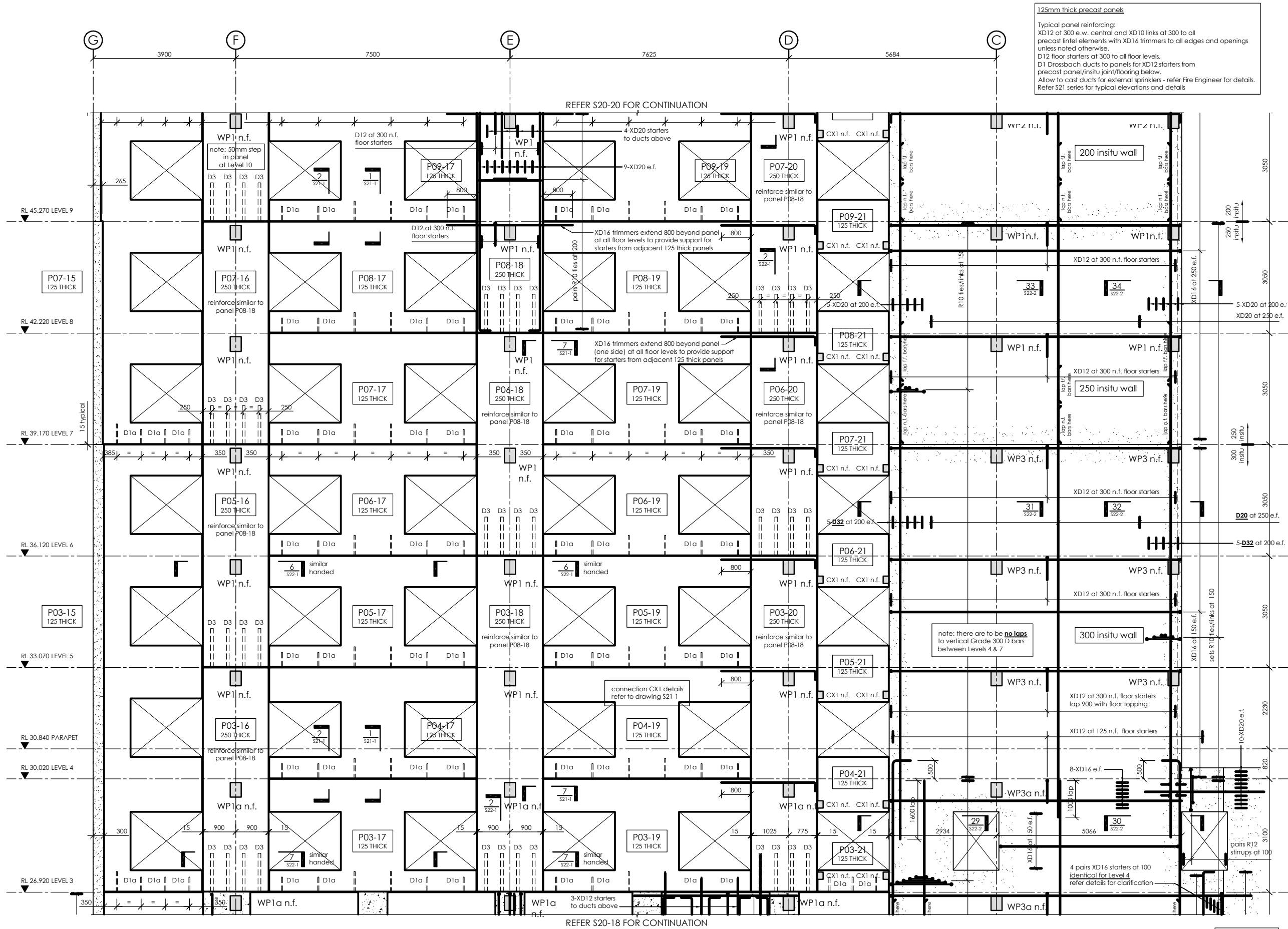
PRECAST PANEL/  
WALL ELEVATION  
Gridline 7  
SHEET 2 OF 3

DRAWN: CPM

ENGINEER:	GPW	1:50 @ A1
CHECKED:	AJW	1:100 @ A3
	CBL	

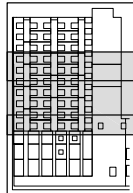
FILE: 106019	DRAWING NO. S20-19	REV. A
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lap locations shown are indicative only.  
all lap locations shall be confirmed with  
Engineer and to suit Contractor preferences  
prior to fabrication. generally n.f. & f.f. laps  
shall be staggered by a full lap length u.n.o.

### KEY PLAN



PRECAST PANEL/WALL ELEVATION Gridline 7

1:50



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CONTRACTOR TO VERIFY ALL DIMENSIONS ON SITE  
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Refer notes sheet at the start of drawing set for notes typically

Refer Architects drawings for all set out dimensions, opening sizes, slab set downs, rebates, sealants etc.

Refer S21 series for typical details of 125mm thick precast panels

Refer S22 series for typical details of insitu walls and structural precast panels greater than 125mm thick

REINFORCING BAR LAPS		
Bar size	Lap length concrete	Lap length concrete block
D12	500 mm	500 mm
D16	650 mm	650 mm
D20	800 mm	800 mm
D25	1000 mm	1000 mm
D32	1300 mm	1300 mm
XD12	700 mm	850 mm
XD16	800 mm	1100 mm
XD20	1000 mm	1400 mm
XD25	1250 mm	1750 mm
XD32	1600 mm	2250 mm

Typically all insitu concrete wall elements to be 30 MPa concrete unless noted otherwise.

Typically all precast concrete and precast beams to be 35 MPa concrete unless noted otherwise.

Unless shown otherwise all horizontal and vertical precast panel joints to be 15mm.

All insitu interfaces and construction joints shall be thoroughly roughened to 5mm amplitude.

All precast to insitu interfaces and grouted joints shall be thoroughly roughened to 5mm amplitude.

Typically horizontal bars in double reinforced panels are to be outside vertical reinforcing 35mm cover to outside bars typical

The lifting and transporting etc., of all panels is the responsibility of the Contractor, this includes the provision of strong backs as required (refer Specification).

The Contractor shall provide two copies of the shop drawings for precast concrete work to the Engineer for approval 14 days prior to manufacture.

REV.	DATE	AMENDMENT	BY
A	22/01/08	CONSTRUCTION ISSUE	GPW
4	31/05/07	CONSENT ISSUE	GPW
3	22/03/07	TENDER UPDATE ISSUE	GPW
2	31/01/07	TENDER ISSUE	GPW
1	21/12/06	FOR CLIENT REVIEW	GPW

ARCHITECT:



lewis bradford  
CONSULTING ENGINEERS

PROJECT:

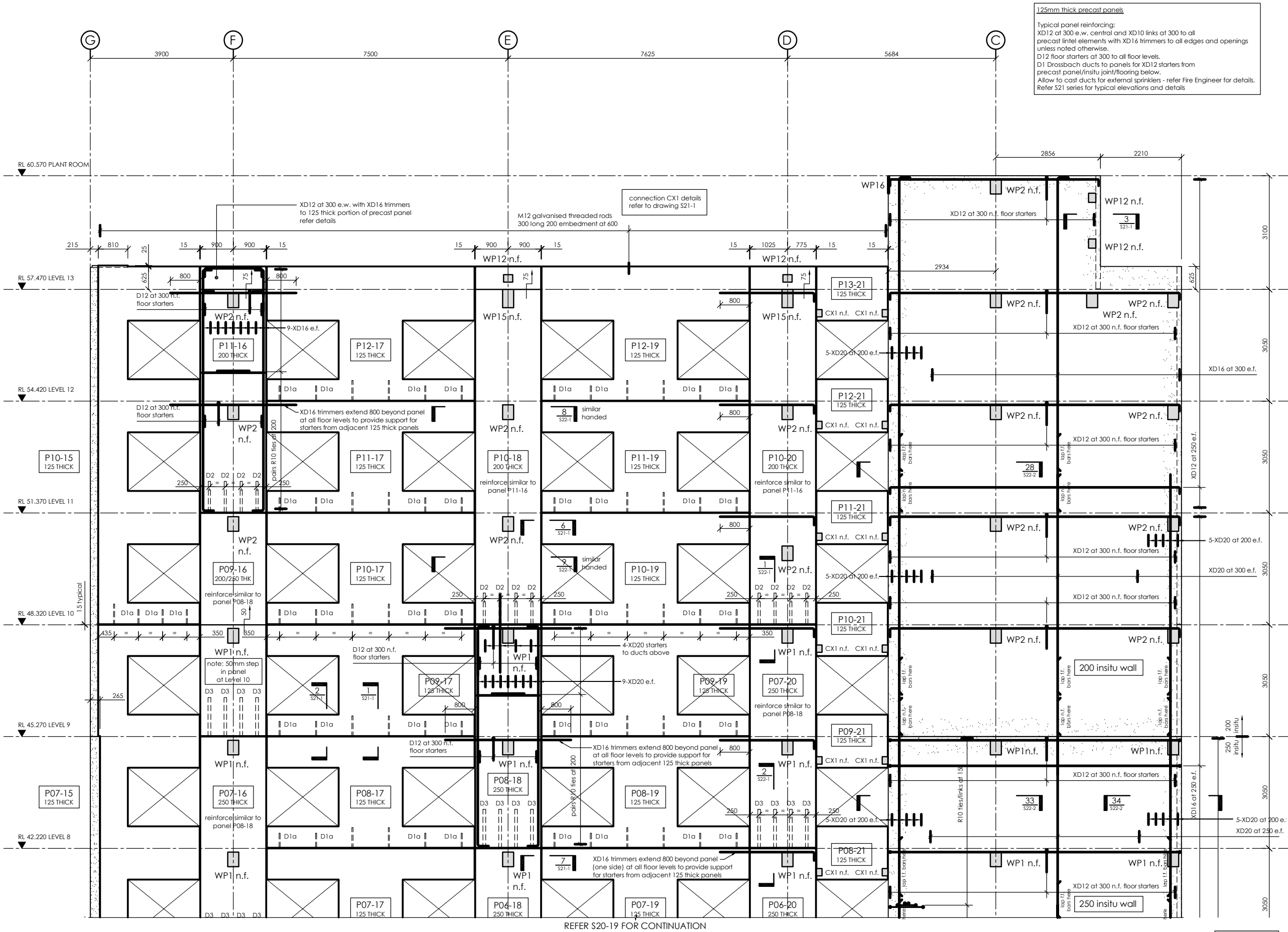
WARNERS NOVOTEL  
CHRISTCHURCH

DRAWING TITLE:

PRECAST PANEL/  
WALL ELEVATION  
Gridline 7  
SHEET 3 OF 3

DRAWN: GPW	SCALE: 1:50 @ A1	REV. A
ENGINEER: AJW	1:100 @ A3	
CHECKED: CBL		
FILE: 106019	DRAWING NO. S20-20	

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Refer notes sheet at the start of drawing set for notes typically

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Refer S21 series for typical details of 125mm thick precast panels

Refer S22 series for typical details of insitu walls and structural precast panels greater than 125mm thick

REINFORCING BAR LAPS		
Bar size	Lap length concrete	Lap length concrete block
D12	500 mm	500 mm
D16	650 mm	650 mm
D20	800 mm	800 mm
D25	1000 mm	1000 mm
D32	1300 mm	1300 mm
XD12	700 mm	850 mm
XD16	800 mm	1100 mm
XD20	1000 mm	1400 mm
XD25	1250 mm	1750 mm
XD32	1600 mm	2250 mm

Typically all insitu concrete wall elements to be 30 MPa concrete unless noted otherwise.

Typically all precast concrete and precast beams to be 35 MPa concrete unless noted otherwise.

Unless shown otherwise all horizontal and vertical precast panel joints to be 15mm.

All insitu interfaces and construction joints shall be thoroughly roughened to 5mm amplitude.

All precast to insitu interfaces and grouted joints shall be thoroughly roughened to 5mm amplitude.

Typically horizontal bars in double reinforced panels are to be outside vertical reinforcing 35mm cover to outside bars typical

The lifting and transporting etc. of all panels is the responsibility of the Contractor, this includes the provision of strong backs as required (refer Specification).

The Contractor shall provide two copies of the shop drawings for precast concrete work to the Engineer for approval 14 days prior to manufacture.

REV.	DATE	AMENDMENT	BY
A	22/01/08	CONSTRUCTION ISSUE	GPW
3	31/05/07	CONSENT ISSUE	GPW
2	31/01/07	TENDER ISSUE	GPW
1	21/12/06	FOR CLIENT REVIEW	GPW

ARCHITECT:



lewis bradford  
CONSULTING ENGINEERS

PROJECT:

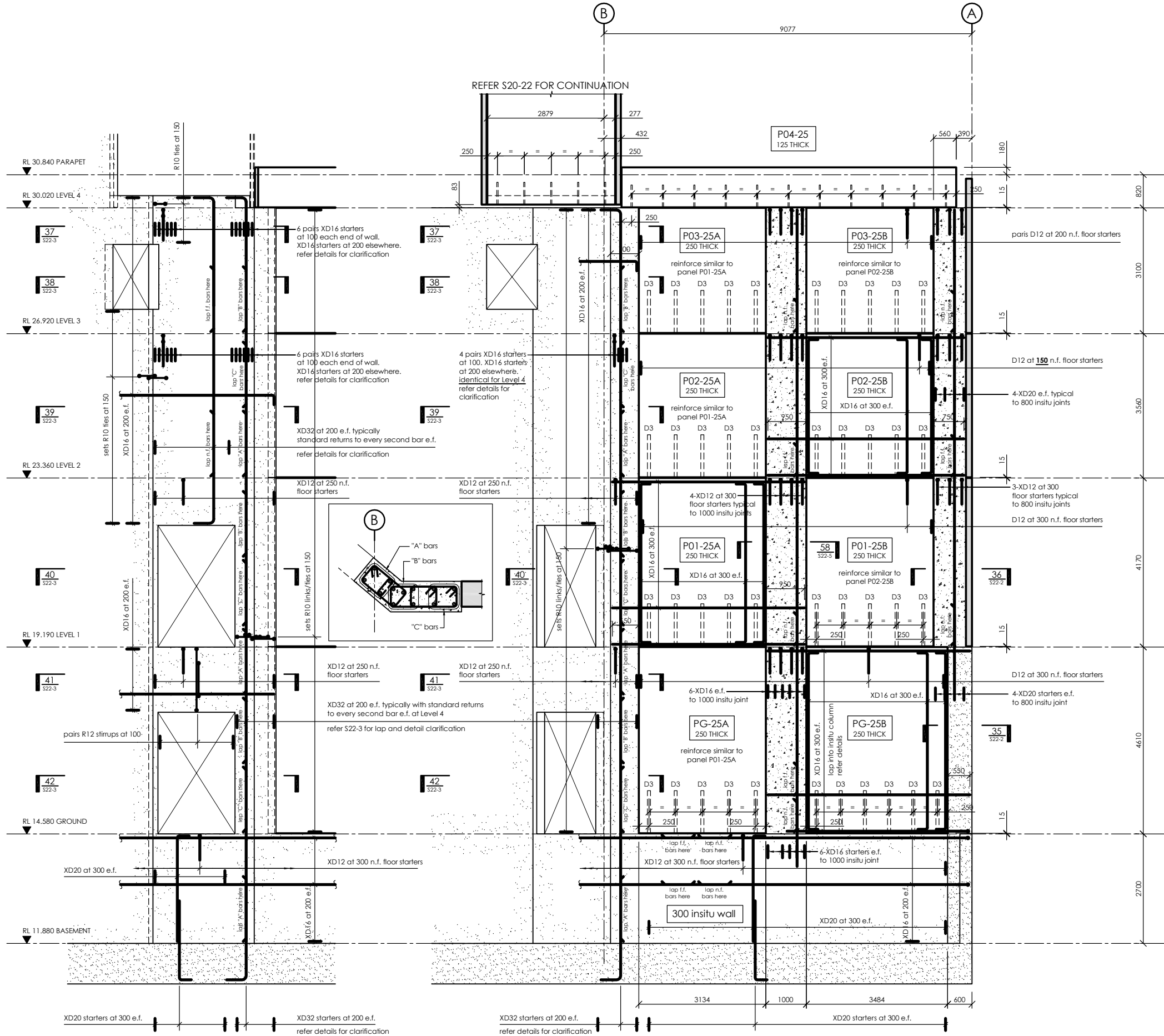
WARNERS NOVOTEL  
CHRISTCHURCH

DRAWING TITLE:

PRECAST PANEL/  
WALL ELEVATION  
Gridline 6  
SHEET 1 OF 2

DRAWN: GPW	SCALE: 1:50 @ A1	
ENGINEER: AJW	1:100 @ A3	
CHECKED: CBL		
FILE: 106019	DRAWING NO. S20-21	REV. A

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TRUE ELEVATION OF CRANK

1:50

refer also Precast Panel/Wall Elevations Gridline 7 (S20-18) and Gridline 6

PRECAST PANEL/WALL ELEVATION Gridline 6

1:50

lap locations shown are indicative only.  
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Engineer and to suit Contractor preferences  
prior to fabrication, generally n.f. & f.f. laps  
shall be staggered by a full lap length u.n.o.

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NOTES:

Refer notes sheet at the start of drawing set for notes typically

Refer Architects drawings for all set out dimensions, opening sizes, slab set downs, rebates, sealants etc.

Refer S21 series for typical details of 125mm thick precast panels

Refer S22 series for typical details of insitu walls and structural precast panels greater than 125mm thick

REINFORCING BAR LAPS		
Bar size	Lap length concrete	Lap length concrete block
D12	500 mm	500 mm
D16	650 mm	650 mm
D20	800 mm	800 mm
D25	1000 mm	1000 mm
D32	1300 mm	1300 mm
XD12	700 mm	850 mm
XD16	800 mm	1100 mm
XD20	1000 mm	1400 mm
XD25	1250 mm	1750 mm
XD32	1600 mm	2250 mm

Typically all insitu concrete wall elements to be 30 MPa concrete unless noted otherwise.

Typically all precast concrete and precast beams to be 35 MPa concrete unless noted otherwise.

Unless shown otherwise all horizontal and vertical precast panel joints to be 15mm.

All insitu interfaces and construction joints shall be thoroughly roughened to 5mm amplitude.

All precast to insitu interfaces and grouted joints shall be thoroughly roughened to 5mm amplitude.

Typically horizontal bars in double reinforced panels are to be outside vertical reinforcing 35mm cover to outside bars typical

The lifting and transporting etc., of all panels is the responsibility of the Contractor, this includes the provision of strong backs as required (refer Specification).

The Contractor shall provide two copies of the shop drawings for precast concrete work to the Engineer for approval 14 days prior to manufacture.

REV.	DATE	AMENDMENT	BY
A	22/01/08	CONSTRUCTION ISSUE	GPW
4	31/05/07	CONSENT ISSUE	GPW
3	22/03/07	TENDER UPDATE ISSUE	GPW
2	31/01/07	TENDER ISSUE	GPW
1	21/12/06	FOR CLIENT REVIEW	GPW

ARCHITECT:



lewis bradford  
CONSULTING ENGINEERS

PROJECT:

WARNERS NOVOTEL  
CHRISTCHURCH

DRAWING TITLE:

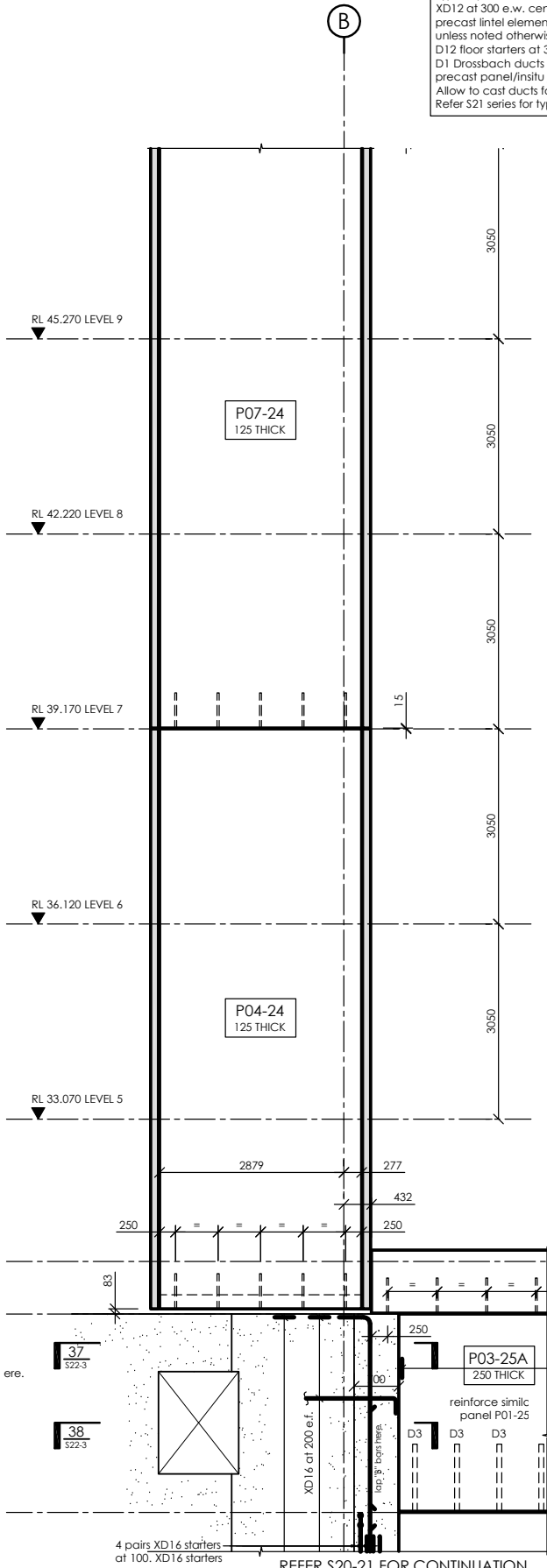
PRECAST PANEL/  
WALL ELEVATION  
Gridline 6  
SHEET 2 OF 2

DRAWN: GPW	SCALE:	
ENGINEER: AJW	1:50 @ A1	
CHECKED: CBL	1:100 @ A3	
FILE: 106019	DRAWING NO. S20-22	REV. A

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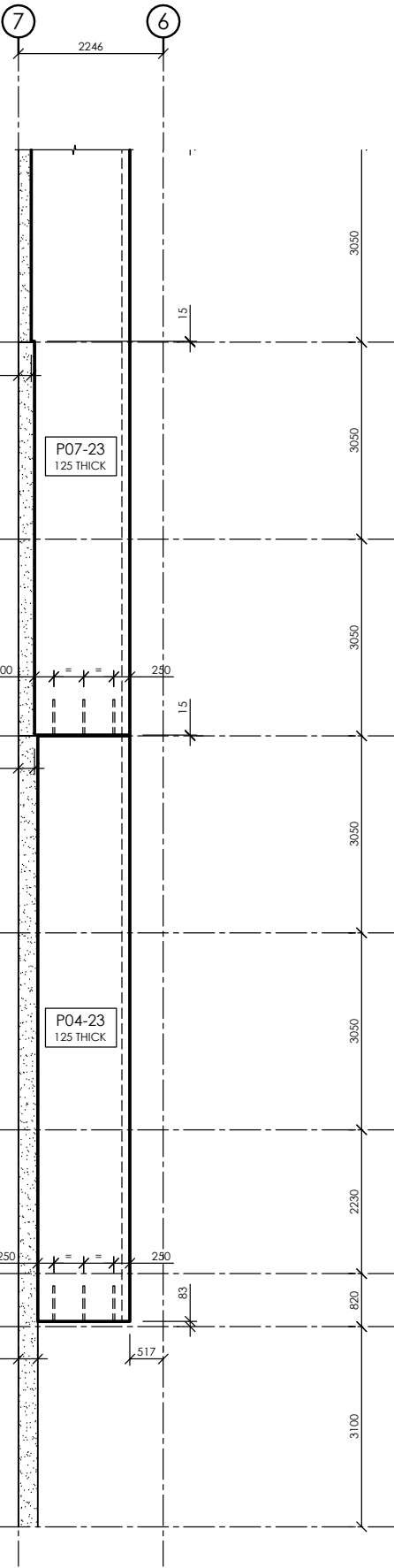
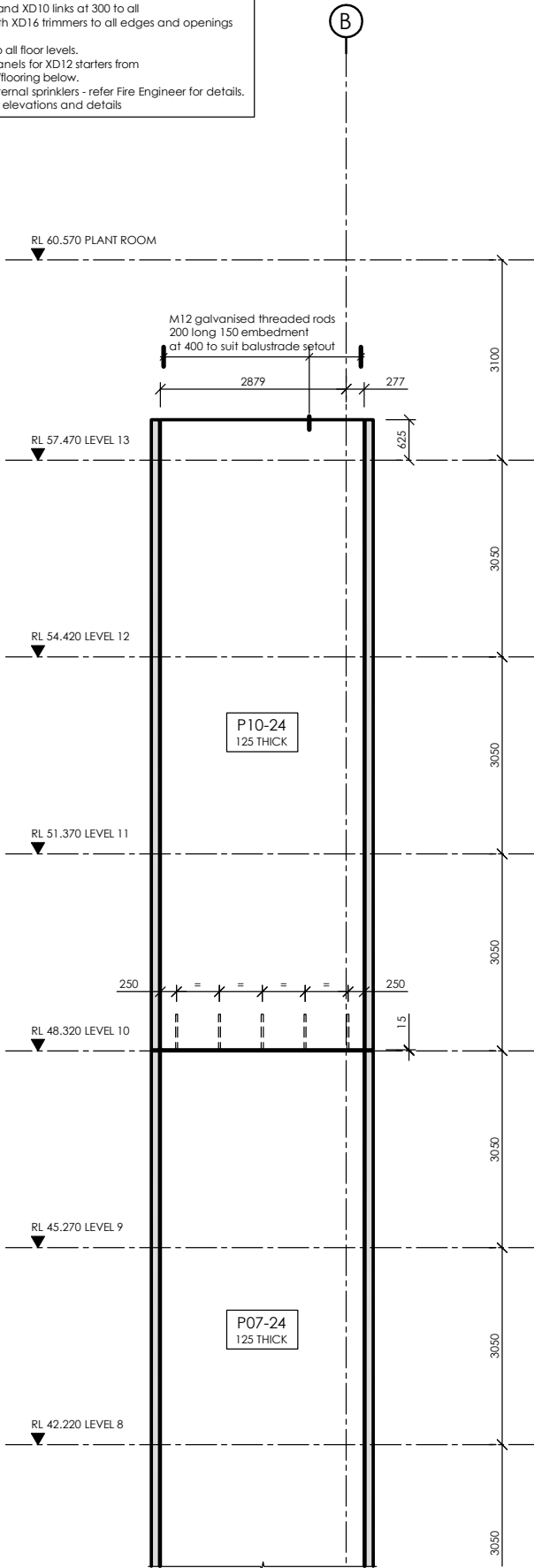
125mm thick precast panels

Typical panel reinforcing:  
XD12 at 300 e.w. central and XD10 links at 300 to all precast intel elements with XD16 trimmers to all edges and openings unless noted otherwise.  
D12 floor starters at 300 to all floor levels.  
D1 Drossbach ducts to panels for XD12 starters from precast panel/insitu joint/flooring below.  
Allow to cast ducts for external sprinklers - refer Fire Engineer for details.  
Refer S21 series for typical elevations and details



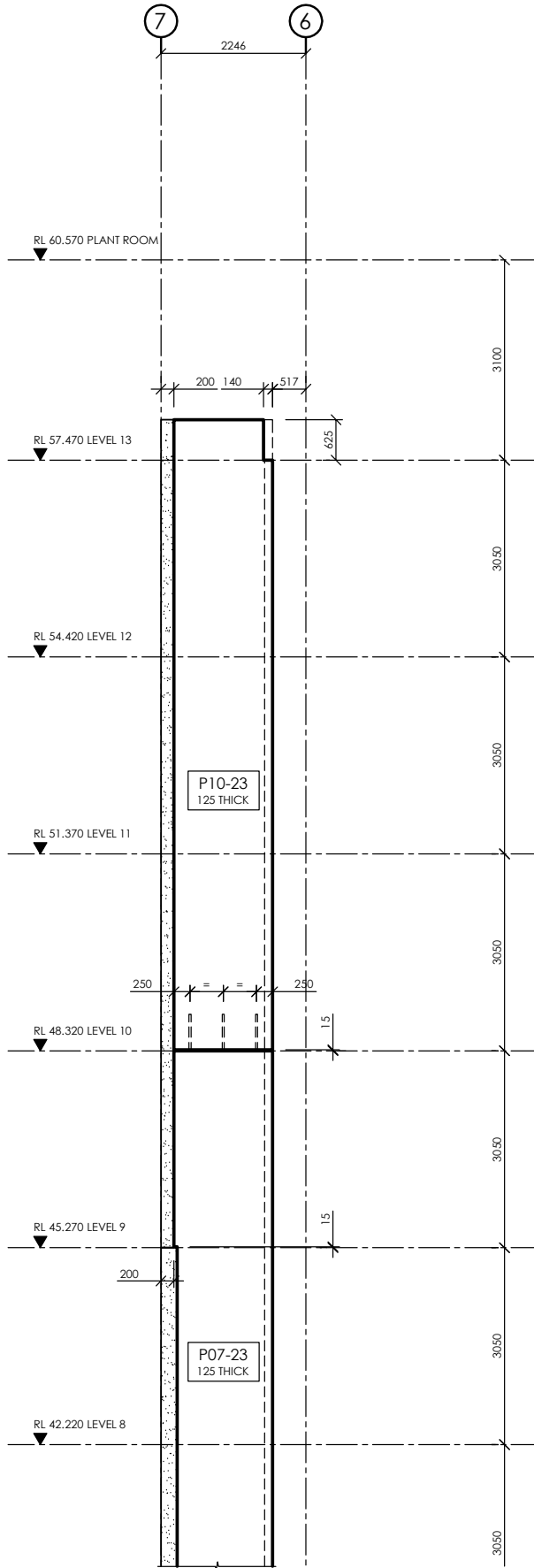
PRECAST PANEL/WALL ELEVATION Gridline 6

1:50



PRECAST PANEL ELEVATION BETWEEN Gridlines B & C

1:50





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CONTRACTOR TO VERIFY ALL DIMENSIONS ON SITE  
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NOTES :

Refer notes sheet at the start of drawing set for notes typically

Refer Architects drawings for all set out dimensions, opening sizes, slab set downs, rebates, sealants etc.

Refer S21 series for typical details of 125mm thick precast panels

Refer S22 series for typical details of  
insitu walls and structural precast panels  
greater than 125mm thick

REINFORCING BAR LAPS		
Bar size	Lap length concrete	Lap length concrete block
D12	500 mm	500 mm
D16	650 mm	650 mm
D20	800 mm	800 mm
D25	1000 mm	1000 mm
D32	1300 mm	1300 mm
XD12	700 mm	850 mm
XD16	800 mm	1100 mm
XD20	1000 mm	1400 mm
XD25	1250 mm	1750 mm
XD32	1600 mm	2250 mm

Typically all insitu concrete wall elements to be 30 MPa concrete unless noted otherwise.

Typically all precast concrete and precast beams to be 35 MPa concrete unless noted otherwise.

Unless shown otherwise all horizontal and vertical precast panel joints to be 15mm.

All insitu interfaces and construction joints shall be thoroughly roughened to 5mm amplitude.

All precast to insitu interfaces and grouted joints shall be thoroughly roughened to 5mm amplitude.

Typically horizontal bars in double reinforced panels are to be outside vertical reinforcing  
35mm cover to outside bars typical

The lifting and transporting etc. of all panels is the responsibility of the Contractor, this includes the provision of strong backs as required (refer Specification).

The Contractor shall provide two copies of the shop drawings for precast concrete work to the Engineer for approval 14 days prior to manufacture.

A	22/01/08	CONSTRUCTION ISSUE	GPW
3	31/05/07	CONSENT ISSUE	GPW
2	31/01/07	TENDER ISSUE	GPW
1	21/12/06	FOR CLIENT REVIEW	GPW
REV.	DATE	AMENDMENT	BY

ARCHITECT:



**lewis bradford**  
CONSULTING ENGINEERS

PROJECT:

WARNERS NOVOTEL  
CHRISTCHURCH

RAWING TITLE:

PRECAST PANEL ELEVATION  
Gridline B  
SHEET 1 OF 2

DRAWN: GPW  
 ENGINEER: AJW  
 CHECKED: CBL

SCALE:

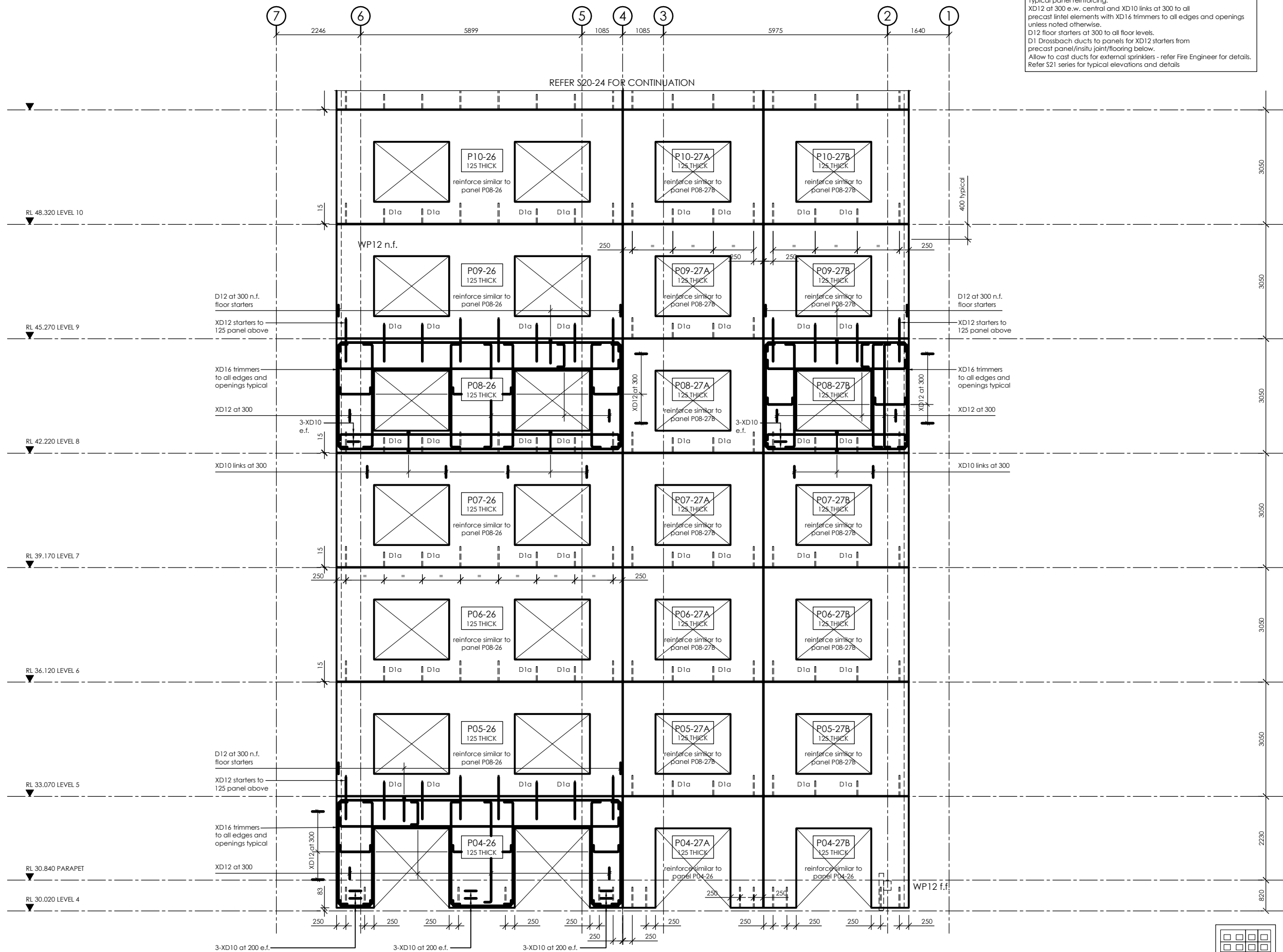
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1:100 @ A3

LE: 106019

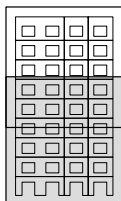
DRAWING NO.	REV.
S20-23	A

Drawings



PRECAST PANEL ELEVATION Gridline B

1:50



## KEY PLAN

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Refer Architects drawings for all set out dimensions, opening sizes, slab set downs, rebates, sealants etc.

Refer S21 series for typical details of 125mm thick precast panels

Refer S22 series for typical details of insitu walls and structural precast panels greater than 125mm thick

REINFORCING BAR LAPS		
Bar size	Lap length concrete	Lap length concrete block
D12	500 mm	500 mm
D16	650 mm	650 mm
D20	800 mm	800 mm
D25	1000 mm	1000 mm
D32	1300 mm	1300 mm
XD12	700 mm	850 mm
XD16	800 mm	1100 mm
XD20	1000 mm	1400 mm
XD25	1250 mm	1750 mm
XD32	1600 mm	2250 mm

Typically all insitu concrete wall elements to be 30 MPa concrete unless noted otherwise.

Typically all precast concrete and precast beams to be 35 MPa concrete unless noted otherwise.

Unless shown otherwise all horizontal and vertical precast panel joints to be 15mm.

All insitu interfaces and construction joints shall be thoroughly roughened to 5mm amplitude.

All precast to insitu interfaces and grouted joints shall be thoroughly roughened to 5mm amplitude.

Typically horizontal bars in double reinforced panels are to be outside vertical reinforcing 35mm cover to outside bars typical

The lifting and transporting etc., of all panels is the responsibility of the Contractor, this includes the provision of strong backs as required (refer Specification).

The Contractor shall provide two copies of the shop drawings for precast concrete work to the Engineer for approval 14 days prior to manufacture.

REV.	DATE	AMENDMENT	BY
A	22/01/08	CONSTRUCTION ISSUE	GPW
4	31/05/07	CONSENT ISSUE	GPW
3	22/03/07	TENDER UPDATE ISSUE	GPW
2	31/01/07	TENDER ISSUE	GPW
1	21/12/06	FOR CLIENT REVIEW	GPW

ARCHITECT:



lewis bradford  
CONSULTING ENGINEERS

PROJECT:

WARNERS NOVOTEL  
CHRISTCHURCH

DRAWING TITLE:

PRECAST PANEL ELEVATION  
Gridline B  
SHEET 2 OF 2

DRAWN: GPW	SCALE:	
ENGINEER: AJW	1:50 @ A1	
CHECKED: CBL	1:100 @ A3	
FILE: 106019	DRAWING NO. S20-24	REV. A

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125mm thick precast panels

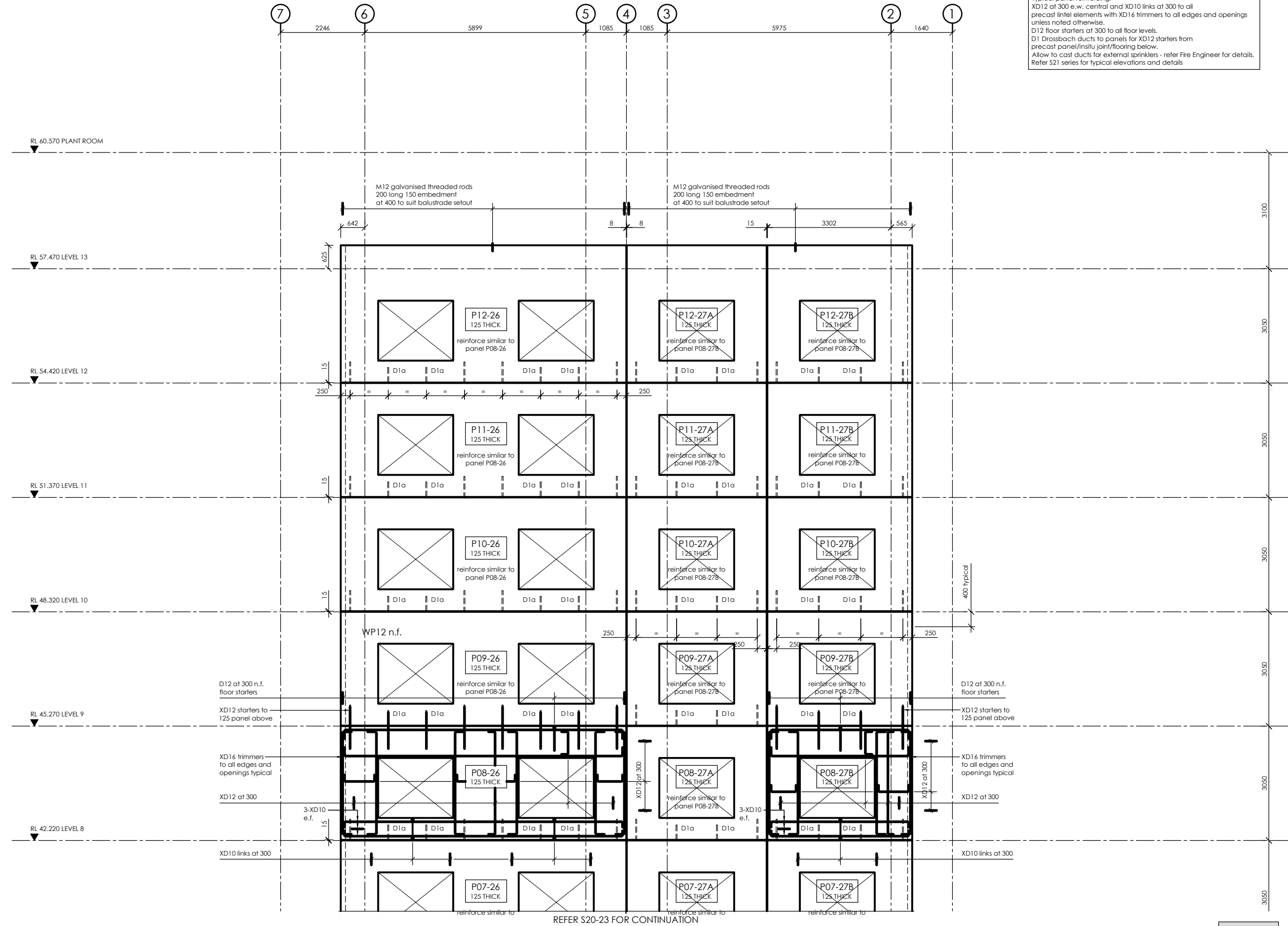
Typical panel reinforcing:

XD12 at 300 e.w. central and XD10 links at 300 to all precast lintel elements with XD16 trimmers to all edges and openings unless noted otherwise.

D12 floor starters at 300 to all floor levels.

D1 Drossbach ducts to panels for XD12 starters from precast panel/insitu joint/flooring below.

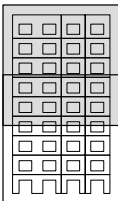
Allow to cast ducts for external sprinklers - refer Fire Engineer for details. Refer S21 series for typical elevations and details



PRECAST PANEL ELEVATION Gridline B

1:50

KEY PLAN



CONTRACTOR TO VERIFY ALL DIMENSIONS ON SITE

NOTES :

Refer Architects drawings for all set out dimensions, opening sizes, slab set downs, rebates, sealants etc.

Refer S22 series for typical details of insitu walls and structural precast panels greater than 125mm thick

Bar size	Lap length concrete	Lap length concrete block
D12	500 mm	500 mm
D16	650 mm	650 mm
D20	800 mm	800 mm
D25	1000 mm	1000 mm
D32	1300 mm	1300 mm
XD12	700 mm	850 mm
XD16	800 mm	1100 mm
XD20	1000 mm	1400 mm
XD25	1250 mm	1750 mm
XD32	1600 mm	2250 mm

Typically all precast concrete and precast beams to be 35 MPa concrete unless noted otherwise.

All insitu interfaces and construction joints shall be thoroughly roughened to 5mm amplitude.

Typically horizontal bars in double reinforced panels are to be outside vertical reinforcing  
35mm cover to outside bars typical

The Contractor shall provide two copies of the shop drawings for precast concrete work to the Engineer for approval 14 days prior to manufacture.

A	22/01/08	CONSTRUCTION ISSUE	GPW
3	31/05/07	CONSENT ISSUE	GPW
2	31/01/07	TENDER ISSUE	GPW
1	21/12/06	FOR CLIENT REVIEW	GPW
REV.	DATE	AMENDMENT	BY

ARCHITECT:



**lewis bradford**  
CONSULTING ENGINEERS

PROJECT:

WARNERS NOVOTEL  
CHRISTCHURCH

DRAWING TITLE:

PRECAST PANEL/  
WALL ELEVATION  
Gridline D  
SHEET 1 OF 2

DRAWN:	GPW
ENGINEER:	AJW
CHECKED:	CBL

SCALE:

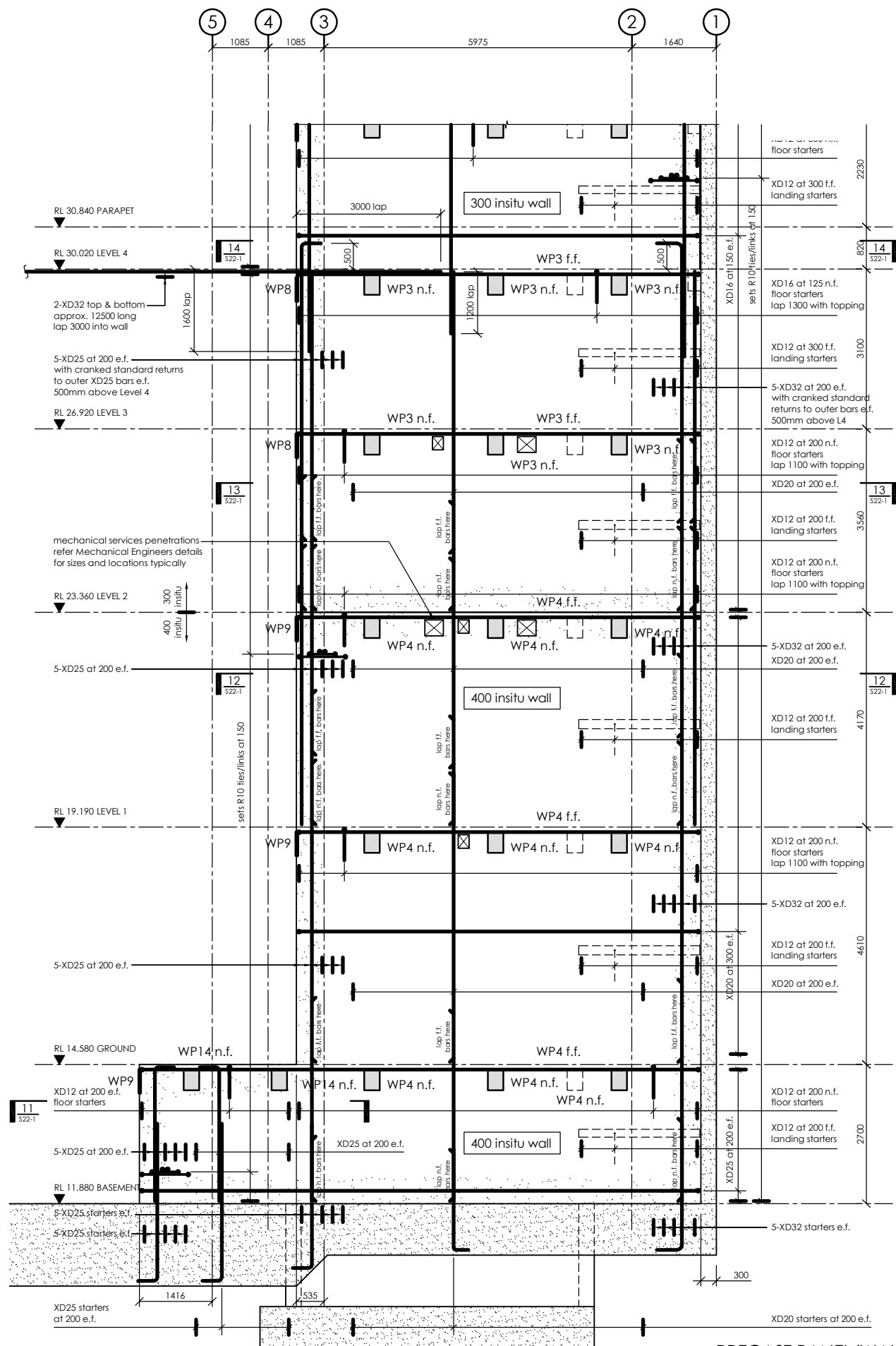
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1:100 @ A3

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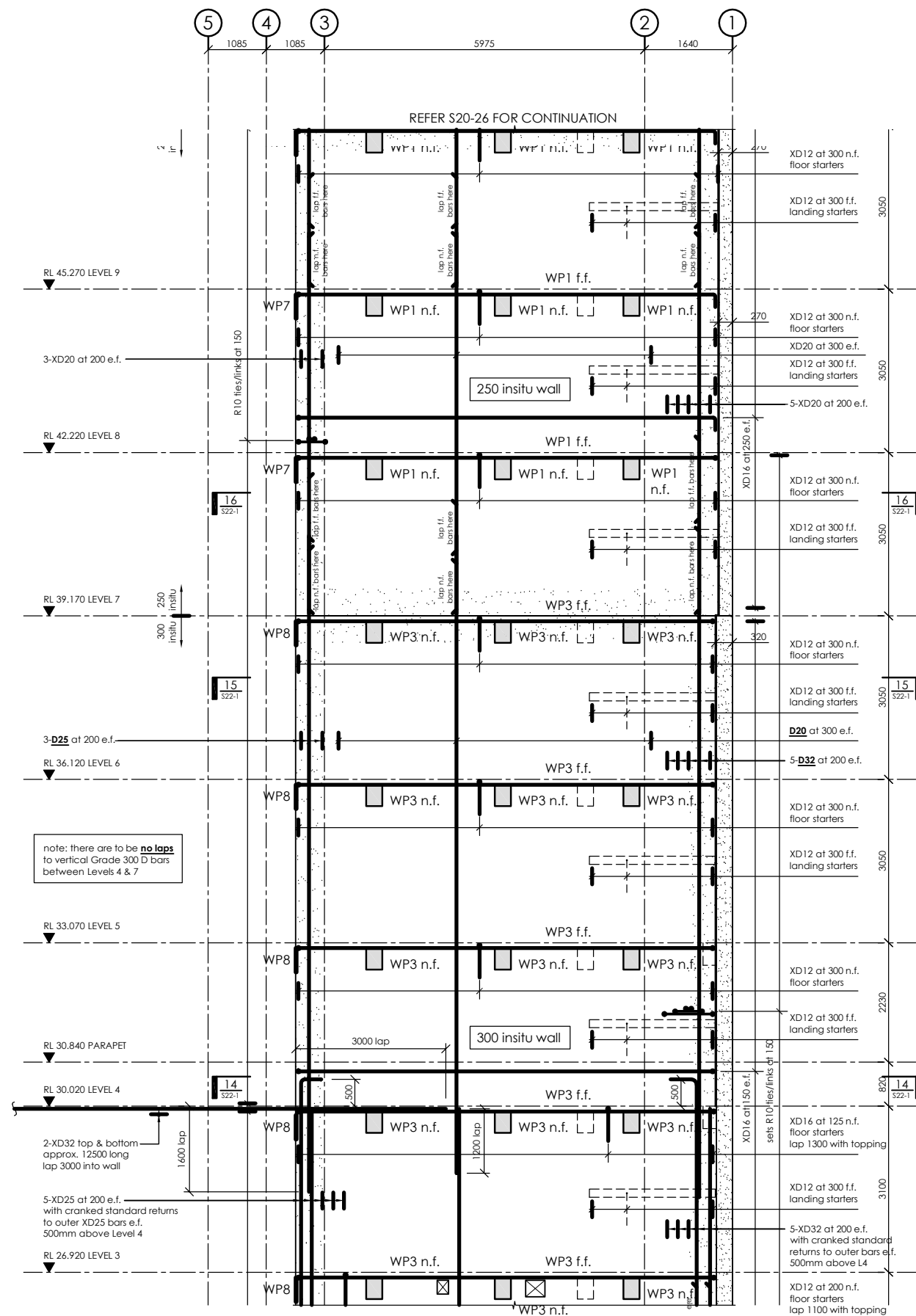
DRAWING NO. <b>S20-25</b>	REV. <b>A</b>
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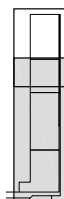
### PRECAST PANEL/WALL ELEVATION Gridline D

1:50



lap locations shown are indicative only.  
all lap locations shall be confirmed with  
Engineer and to suit Contractor preferences  
prior to fabrication. generally n.f. & f.f. laps  
shall be staggered by a full lap length u.n.o.

### KEY PLAN





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NOTES:

Refer notes sheet at the start of drawing set for notes typically

Refer Architects drawings for all set out dimensions, opening sizes, slab set downs, rebates, sealants etc.

Refer S21 series for typical details of 125mm thick precast panels

Refer S22 series for typical details of insitu walls and structural precast panels greater than 125mm thick

REINFORCING BAR LAPS		
Bar size	Lap length concrete	Lap length concrete block
D12	500 mm	500 mm
D16	650 mm	650 mm
D20	800 mm	800 mm
D25	1000 mm	1000 mm
D32	1300 mm	1300 mm
XD12	700 mm	850 mm
XD16	800 mm	1100 mm
XD20	1000 mm	1400 mm
XD25	1250 mm	1750 mm
XD32	1600 mm	2250 mm

Typically all insitu concrete wall elements to be 30 MPa concrete unless noted otherwise.

Typically all precast concrete and precast beams to be 35 MPa concrete unless noted otherwise.

Unless shown otherwise all horizontal and vertical precast panel joints to be 15mm.

All insitu interfaces and construction joints shall be thoroughly roughened to 5mm amplitude.

All precast to insitu interfaces and grouted joints shall be thoroughly roughened to 5mm amplitude.

Typically horizontal bars in double reinforced panels are to be outside vertical reinforcing 35mm cover to outside bars typical

The lifting and transporting etc., of all panels is the responsibility of the Contractor, this includes the provision of strong backs as required (refer Specification).

The Contractor shall provide two copies of the shop drawings for precast concrete work to the Engineer for approval 14 days prior to manufacture.

REV.	DATE	AMENDMENT	BY
A	22/01/08	CONSTRUCTION ISSUE	GPW
3	31/05/07	CONSENT ISSUE	GPW
2	31/01/07	TENDER ISSUE	GPW
1	21/12/06	FOR CLIENT REVIEW	GPW

ARCHITECT:



lewis bradford  
CONSULTING ENGINEERS

PROJECT:

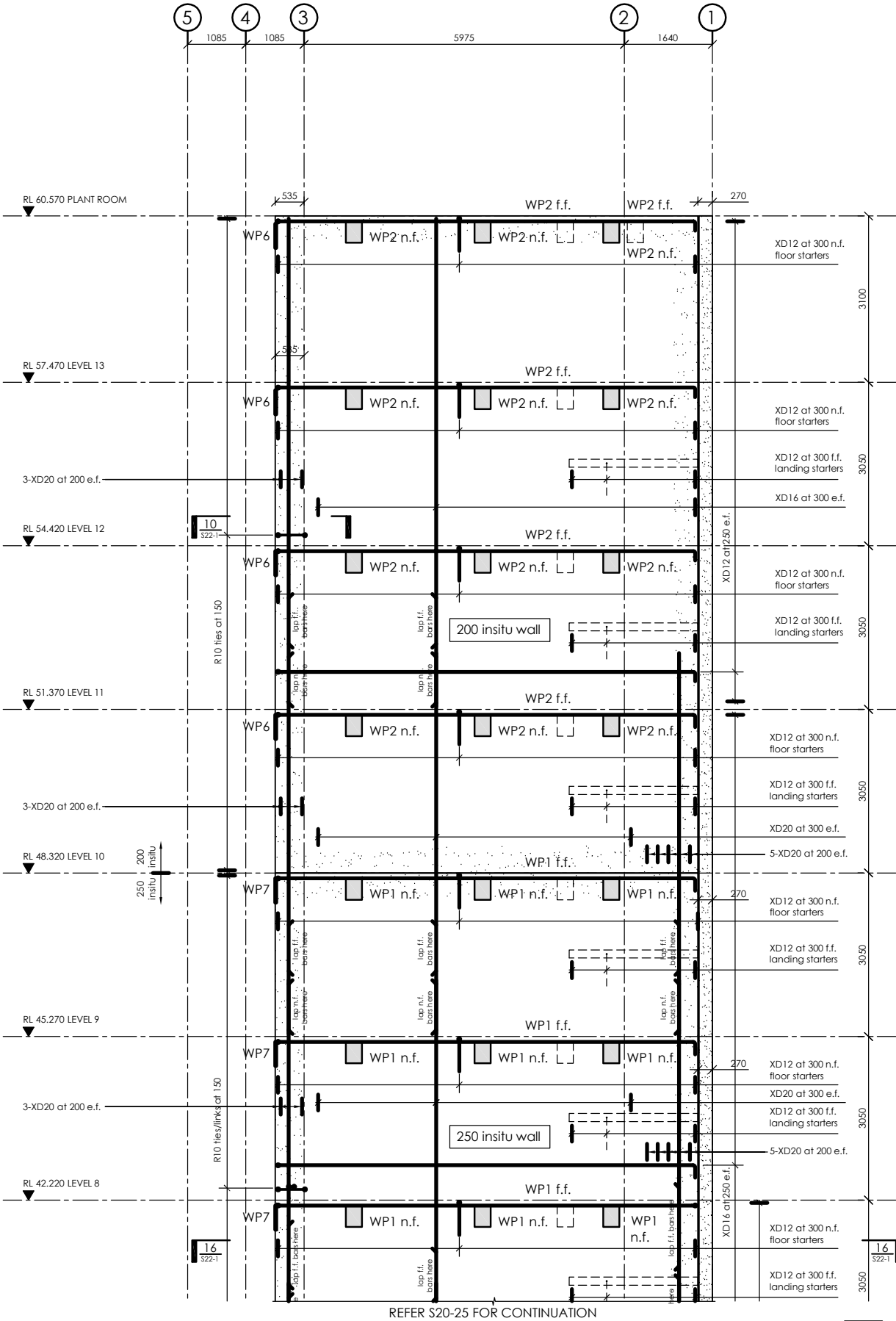
WARNERS NOVOTEL  
CHRISTCHURCH

DRAWING TITLE:

PRECAST PANEL/  
WALL ELEVATION  
Gridline D  
SHEET 2 OF 2

DRAWN:	GPW	SCALE:	1:50 @ A1
ENGINEER:	AJW		1:100 @ A3
CHECKED:	CBL		
FILE:	106019	DRAWING NO.	S20-26
		REV.	A

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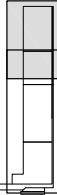


REFER S20-25 FOR CONTINUATION

PRECAST PANEL/WALL ELEVATION Gridline D

1:50

KEY PLAN



lap locations shown are indicative only.  
all lap locations shall be confirmed with  
Engineer and to suit Contractor preferences  
prior to fabrication, generally n.f. & f.f. laps  
shall be staggered by a full lap length u.n.o.

NOTES:

Refer notes sheet at the start of drawing set for notes typically

Refer Architects drawings for all set out dimensions, opening sizes, slab set downs, rebates, sealants etc.

Refer S21 series for typical details of 125mm thick precast panels

Refer S22 series for typical details of insitu walls and structural precast panels greater than 125mm thick

REINFORCING BAR LAPS		
Bar size	Lap length concrete	Lap length concrete block
D12	500 mm	500 mm
D16	650 mm	650 mm
D20	800 mm	800 mm
D25	1000 mm	1000 mm
D32	1300 mm	1300 mm
XD12	700 mm	850 mm
XD16	800 mm	1100 mm
XD20	1000 mm	1400 mm
XD25	1250 mm	1750 mm
XD32	1600 mm	2250 mm

Typically all insitu concrete wall elements to be 30 MPa concrete unless noted otherwise.

Typically all precast concrete and precast beams to be 35 MPa concrete unless noted otherwise.

Unless shown otherwise all horizontal and vertical precast panel joints to be 15mm.

All insitu interfaces and construction joints shall be thoroughly roughened to 5mm amplitude.

All precast to insitu interfaces and grouted joints shall be thoroughly roughened to 5mm amplitude.

Typically horizontal bars in double reinforced panels are to be outside vertical reinforcing 35mm cover to outside bars typical

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REV.	DATE	AMENDMENT	BY
A	22/01/08	CONSTRUCTION ISSUE	GPW
3	31/05/07	CONSENT ISSUE	GPW
2	31/01/07	TENDER ISSUE	GPW
1	21/12/06	FOR CLIENT REVIEW	GPW

ARCHITECT:



lewis bradford  
CONSULTING ENGINEERS

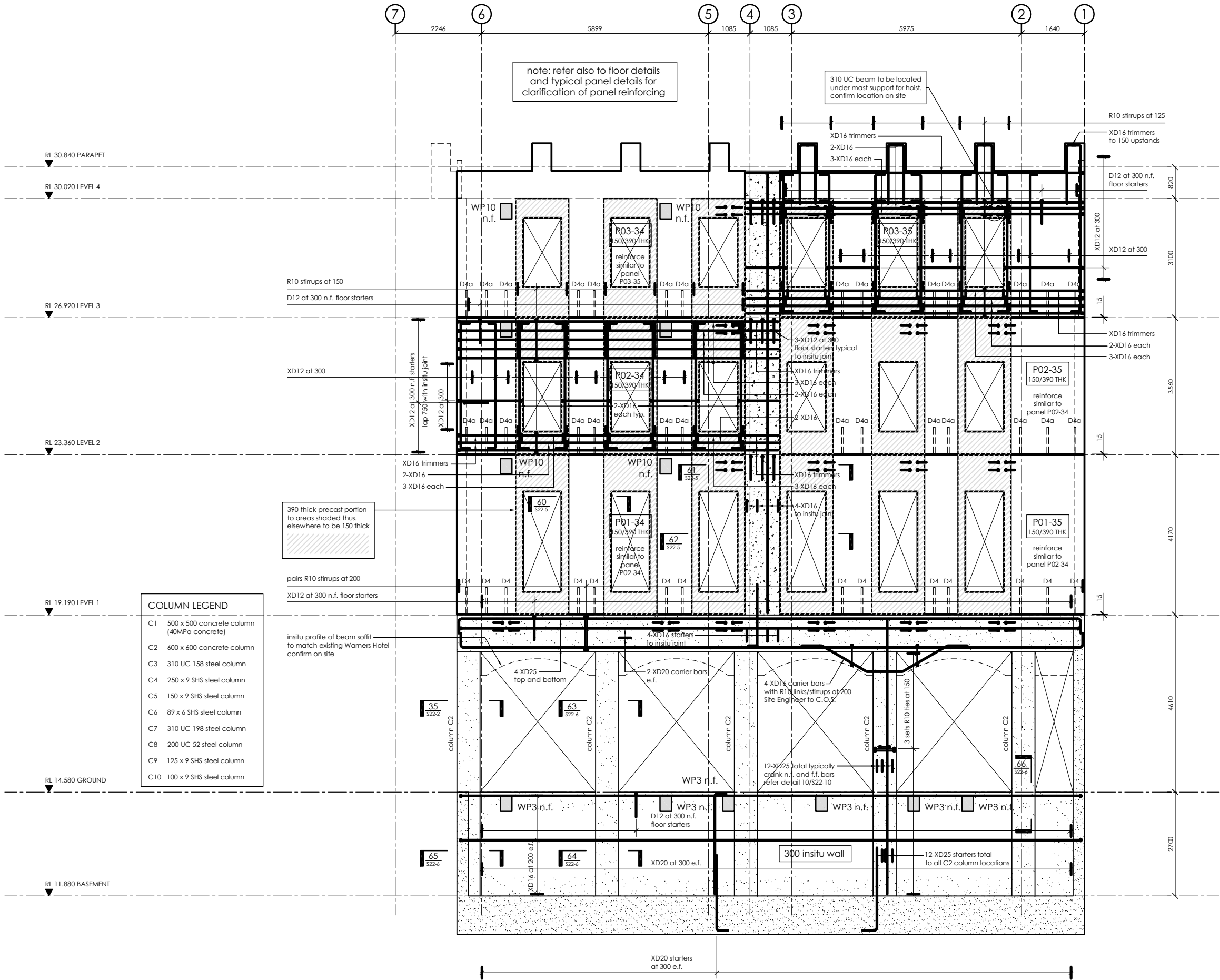
PROJECT:

WARNERS NOVOTEL  
CHRISTCHURCH

DRAWING TITLE:

PRECAST PANEL/  
WALL ELEVATION  
Gridline A

DRAWN: GPW	SCALE:	
ENGINEER: AJW	1:50 @ A1	
CHECKED: CBL	1:100 @ A3	
FILE: 106019	DRAWING NO. S20-27	REV. A



PRECAST PANEL/WALL ELEVATION Gridline A

1:50

CONTRACTOR TO VERIFY ALL DIMENSIONS ON SITE

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1	31/01/07	TENDER ISSUE	GPW
REV.	DATE	AMENDMENT	BY

ARCHITECT:



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CONSULTING ENGINEERS

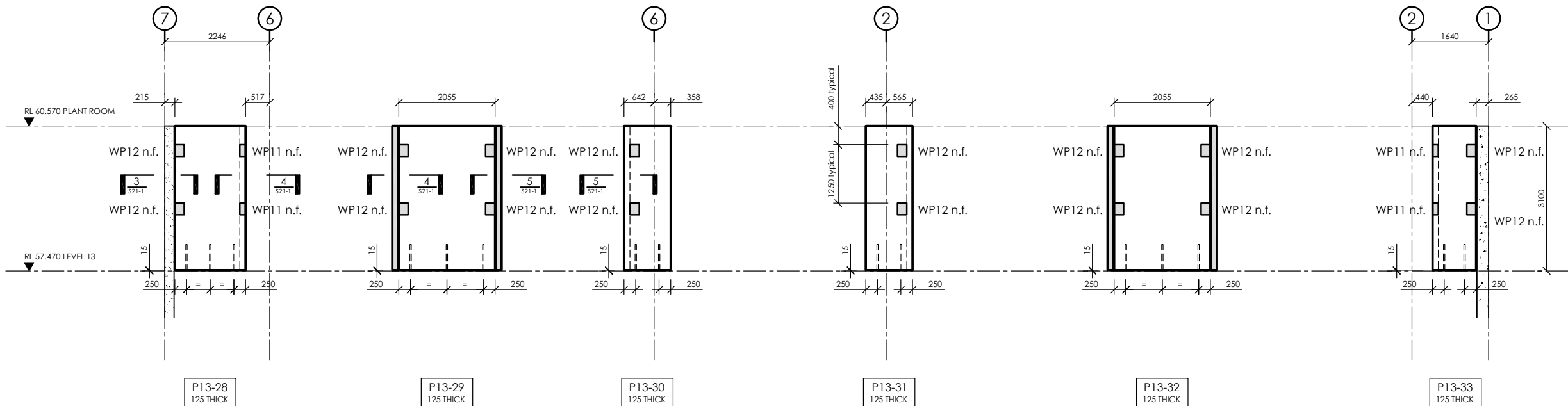
PROJECT:

WARNERS NOVOTEL  
CHRISTCHURCH

DRAWING TITLE:

# PRECAST PANEL ELEVATION LEVEL 13

DRAWN: GPW	SCALE: 1:50 @ A1 1:100 @ A3	
ENGINEER: AJW		
CHECKED: CBL		
FILE: 106019	DRAWING NO. S20-28	REV. A



PRECAST PANEL ELEVATION LEVEL 13

1:50

125mm thick precast panels

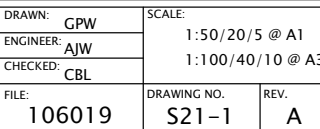
Typical panel reinforcing:  
XD12 at 300 e.w. central and XD10 links at 300 to all precast lintel elements with XD16 trimmers to all edges and openings unless noted otherwise.  
D12 floor starters at 300 to all floor levels.  
D1 Drossbach ducts to panels for XD12 starters from precast panel/insitu joint/floor below.  
Allow to cast ducts for external sprinklers - refer Fire Engineer for details.  
Refer S21 series for typical elevations and details



CONTRACTOR TO VERIFY ALL DIMENSIONS ON SITE  
REFER TO ARCHITECT'S DRAWING FOR ALL SETOUTS

Refer S22 series for typical details of  
insitu walls and structural precast panels  
greater than 125mm thick

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1	21/12/06	FOR CLIENT REVIEW	GPW

ARCHITECT:



lewis bradford  
CONSULTING ENGINEERS

PROJECT:

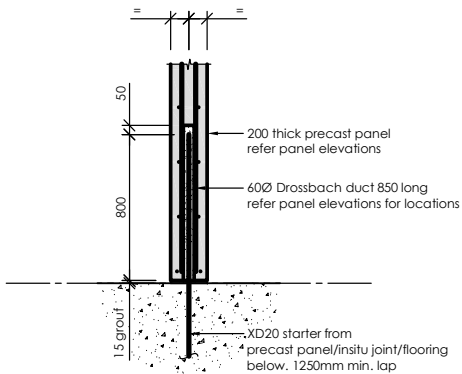
WARNERS NOVOTEL  
CHRISTCHURCH

DRAWING TITLE:

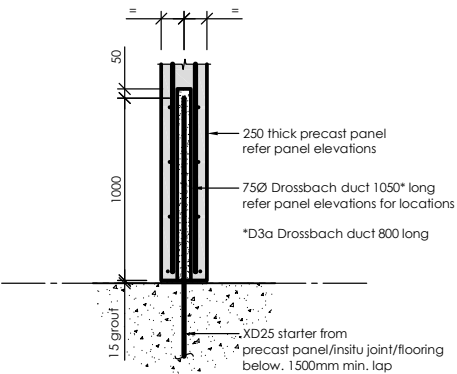
PRECAST PANEL/WALL  
TYPICAL DETAILS  
SHEET 1 OF 6

DRAWN: GPW	SCALE:	
ENGINEER: AJW	1:20 @ A1	
CHECKED: CBL	1:40 @ A3	
FILE: 106019	DRAWING NO. S22-1	REV. A

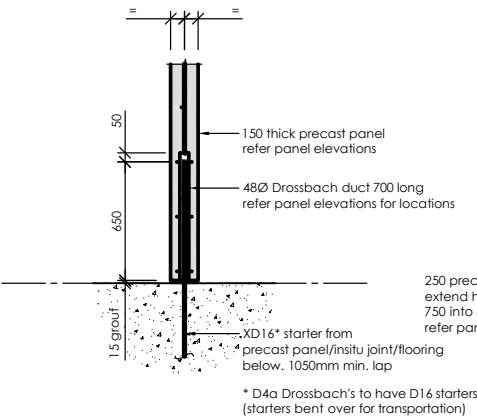
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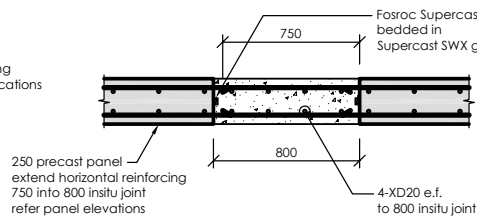
D2 DROSSBACH DETAIL



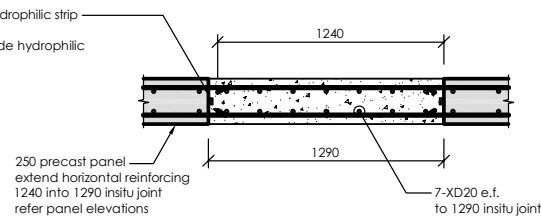
D3 DROSSBACH DETAIL



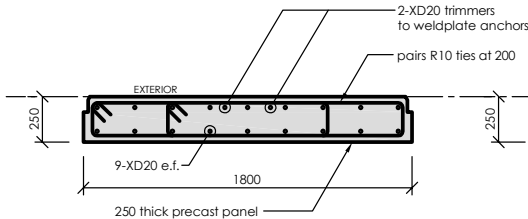
D4 DROSSBACH DETAIL



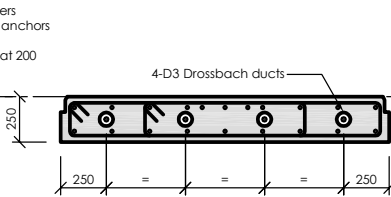
TYPICAL 800 WIDE INSITU JOINT



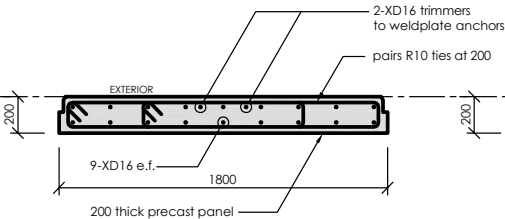
TYPICAL 1290 WIDE INSITU JOINT



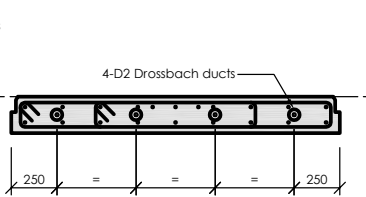
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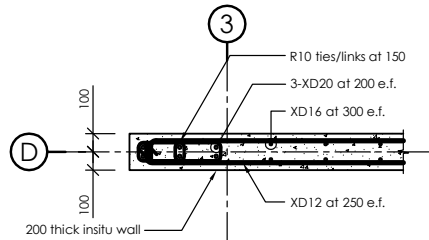
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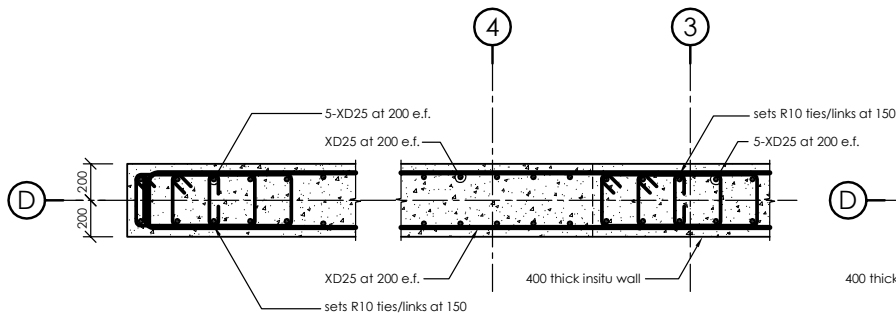
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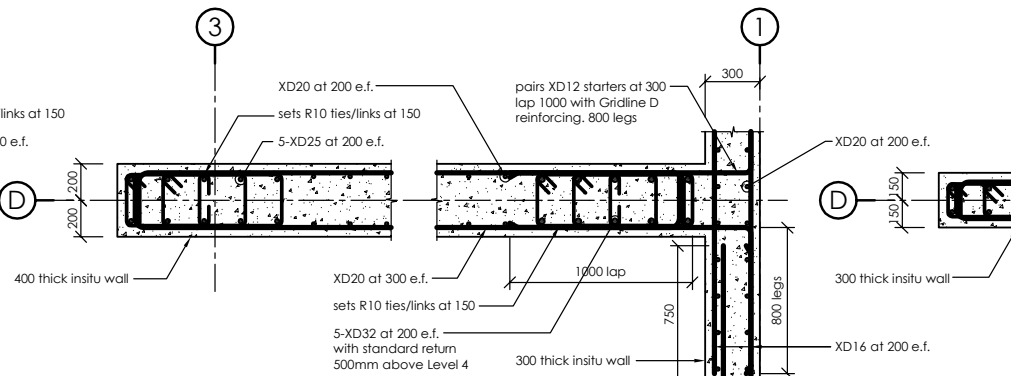
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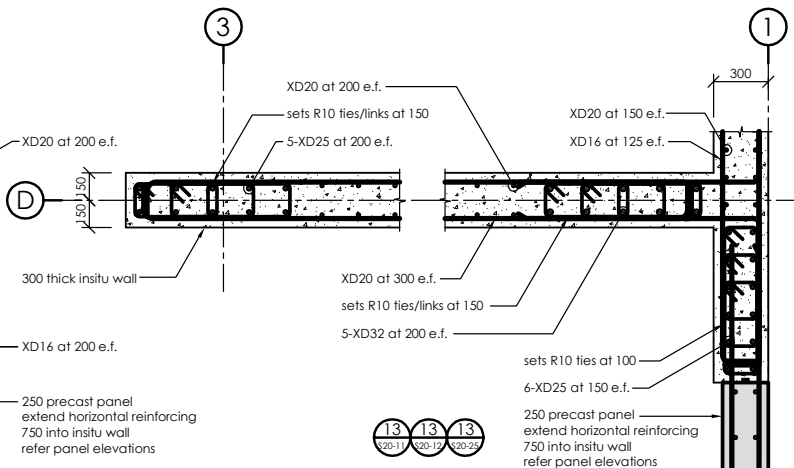
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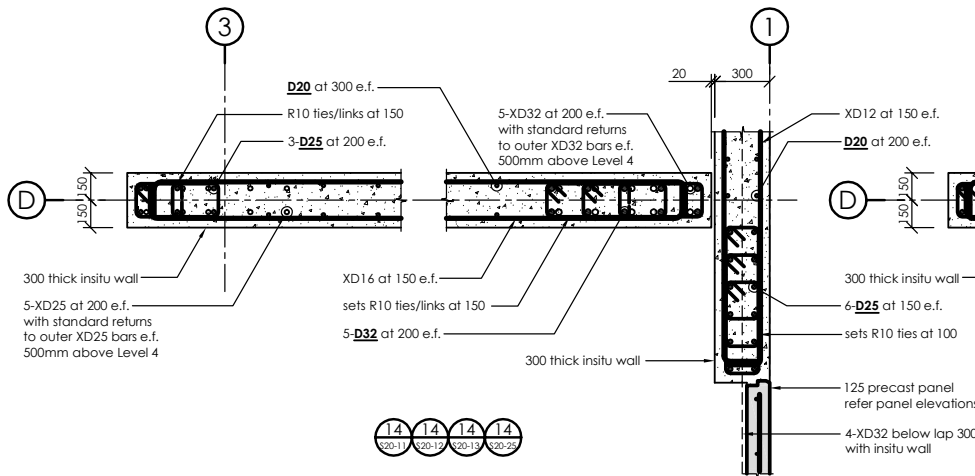
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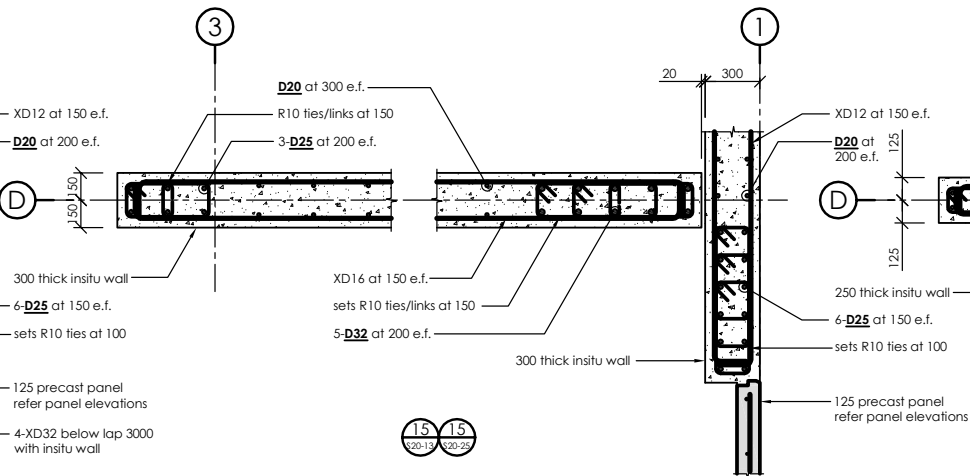
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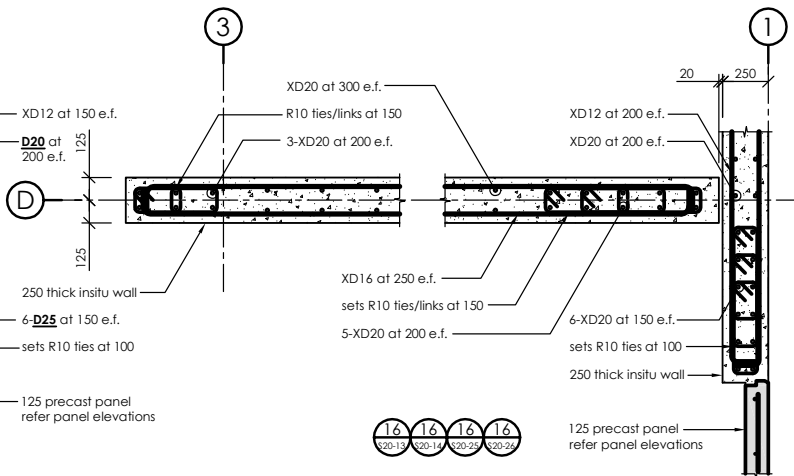
13



14



15



16

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REINFORCING BAR LAPS		
Bar size	Lap length concrete	Lap length concrete block
D12	500 mm	500 mm
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Unless shown otherwise all horizontal and vertical precast panel joints to be 15mm.

All insitu interfaces and construction joints shall be thoroughly roughened to 5mm amplitude.

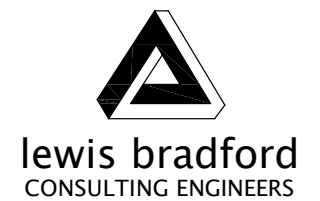
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A	22/01/08	CONSTRUCTION ISSUE	GPW
3	31/05/07	CONSENT ISSUE	GPW
2	22/03/07	TENDER UPDATE ISSUE	GPW
1	31/01/07	TENDER ISSUE	GPW



PROJECT:

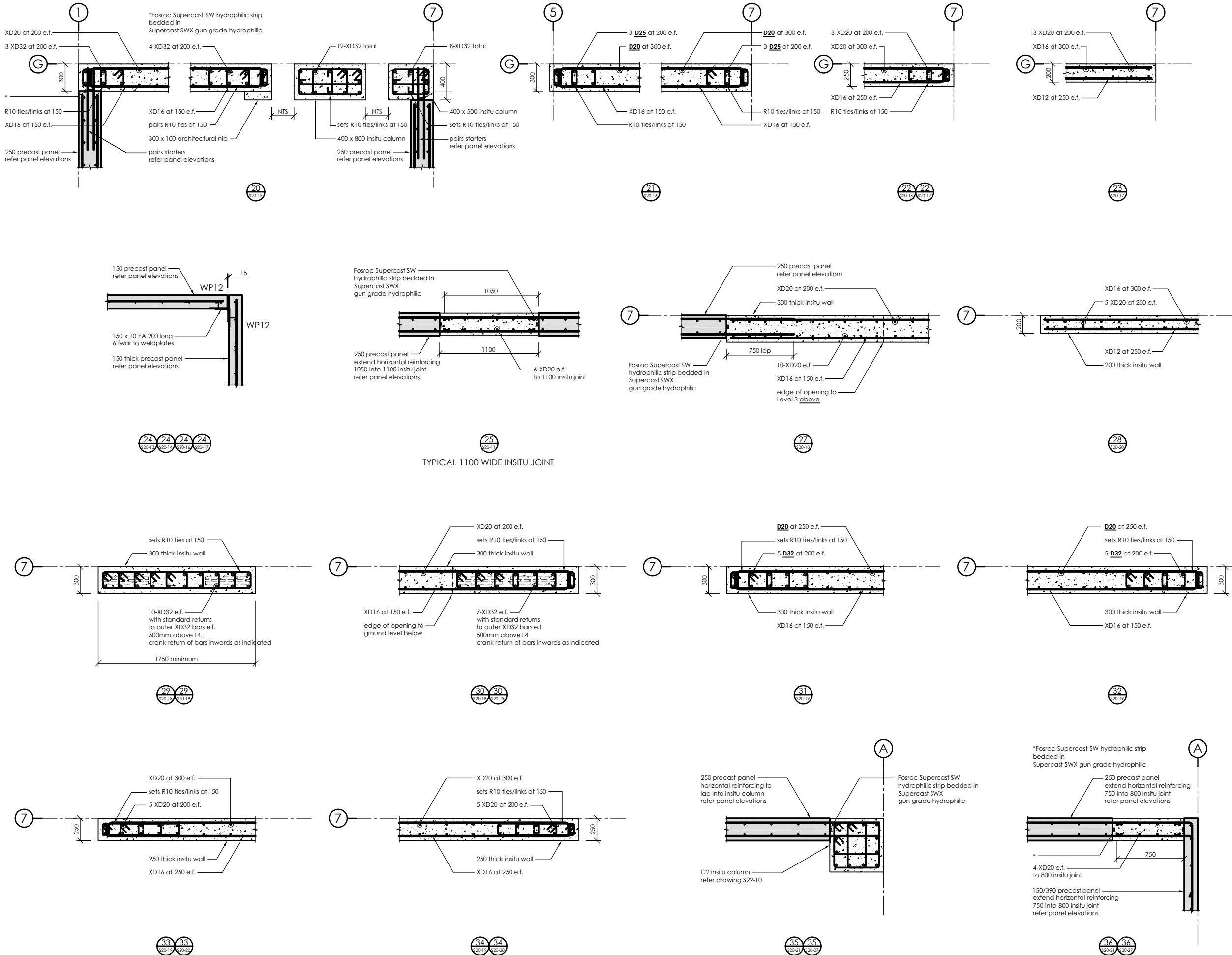
**WARNERS NOVOTEL  
CHRISTCHURCH**

DRAWING TITLE:

**PRECAST PANEL/WALL  
TYPICAL DETAILS  
SHEET 2 OF 6**

DRAWN: GPW	SCALE:	
ENGINEER: AJW	1:20 @ A1	
CHECKED: CBL	1:40 @ A3	
FILE: 106019	DRAWING NO. S22-2	REV. A

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REV.	DATE	AMENDMENT	BY

ARCHITECT:



lewis bradford  
CONSULTING ENGINEERS

PROJECT:

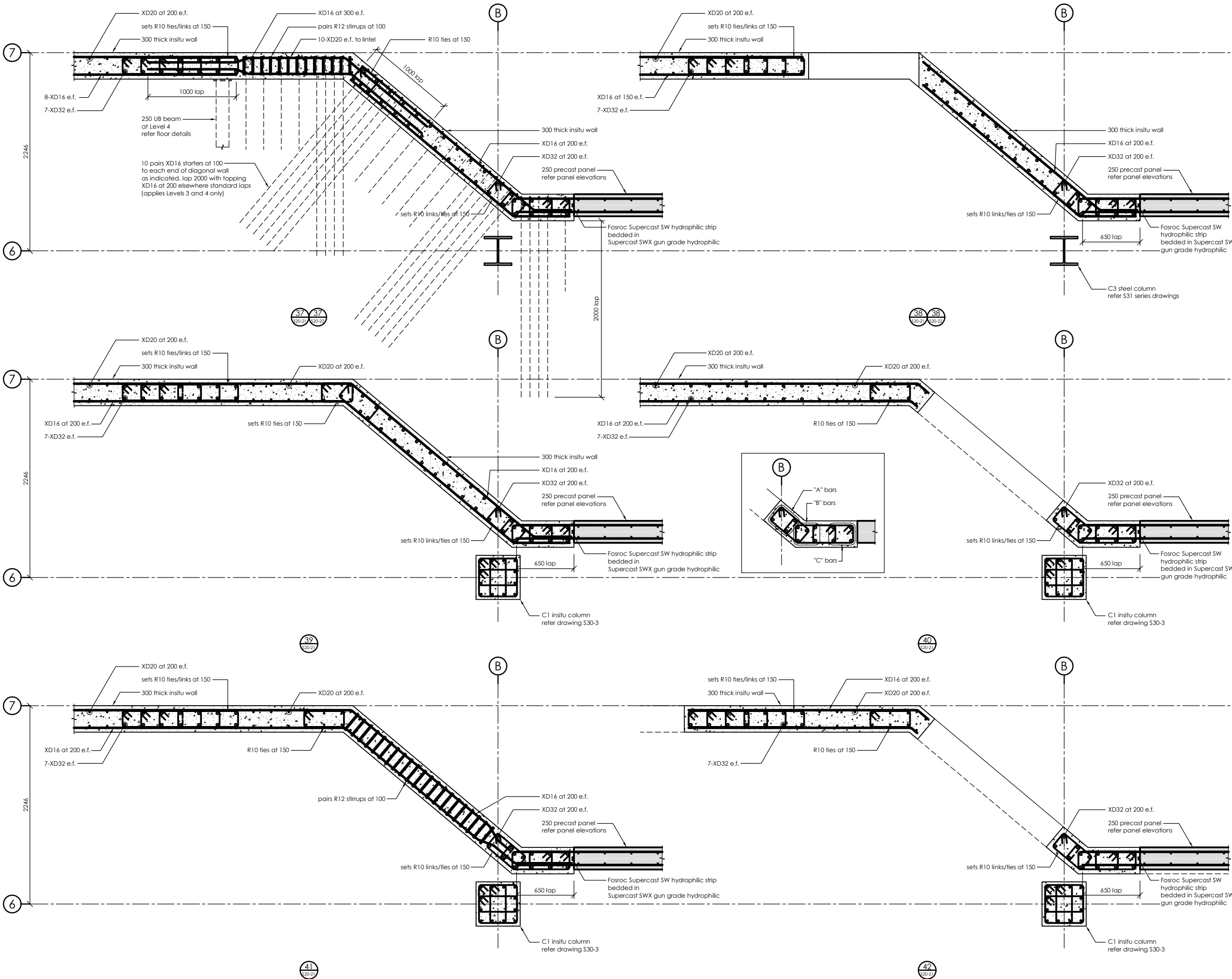
WARNERS NOVOTEL  
CHRISTCHURCH

DRAWING TITLE:

PRECAST PANEL/WALL  
TYPICAL DETAILS  
SHEET 3 OF 6

DRAWN:	GPW	SCALE:	1:20 @ A1
ENGINEER:	AJW		1:40 @ A3
CHECKED:	CBL		
FILE:	106019	DRAWING NO.	S22-3
		REV.	A

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I	31/05/07	CONSENT ISSUE	GPW
REV.	DATE	AMENDMENT	BY

ARCHITECT:



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CONSULTING ENGINEERS

PROJECT:

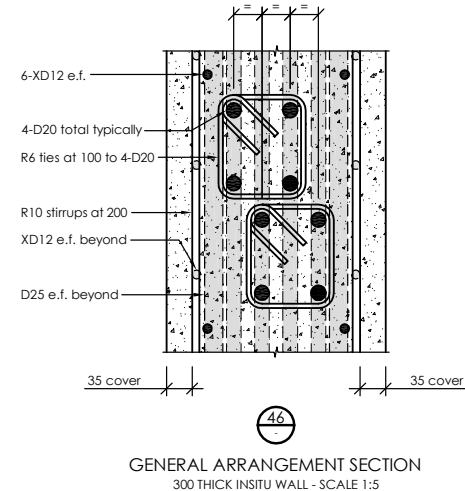
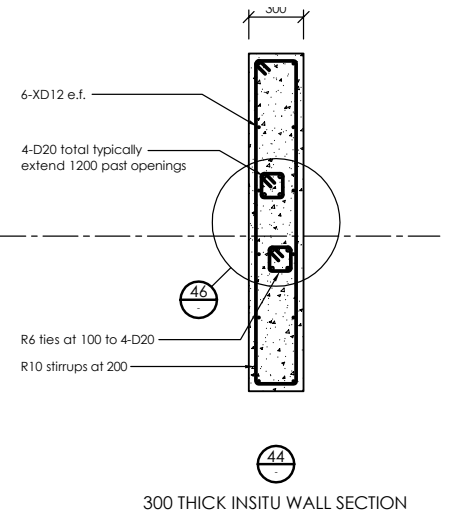
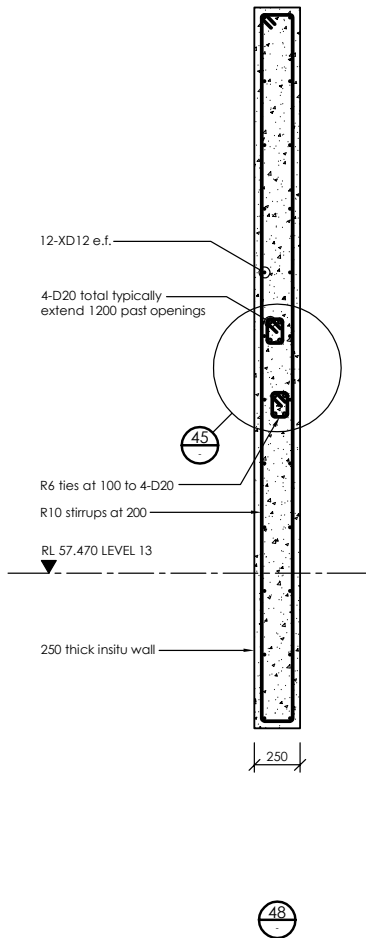
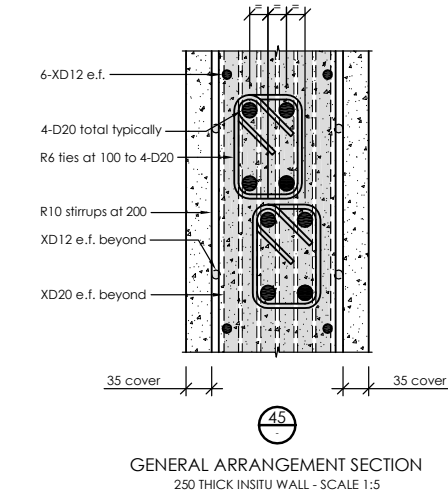
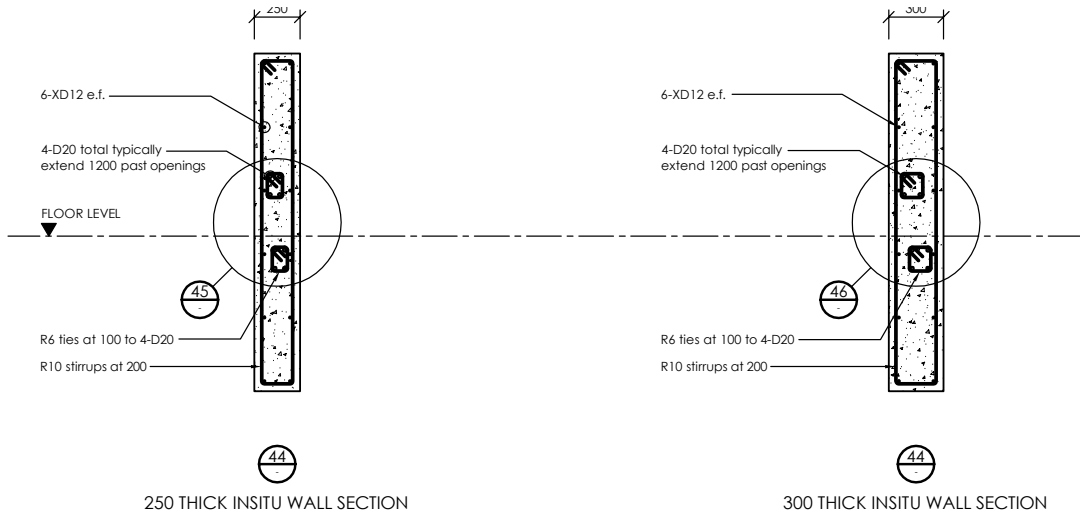
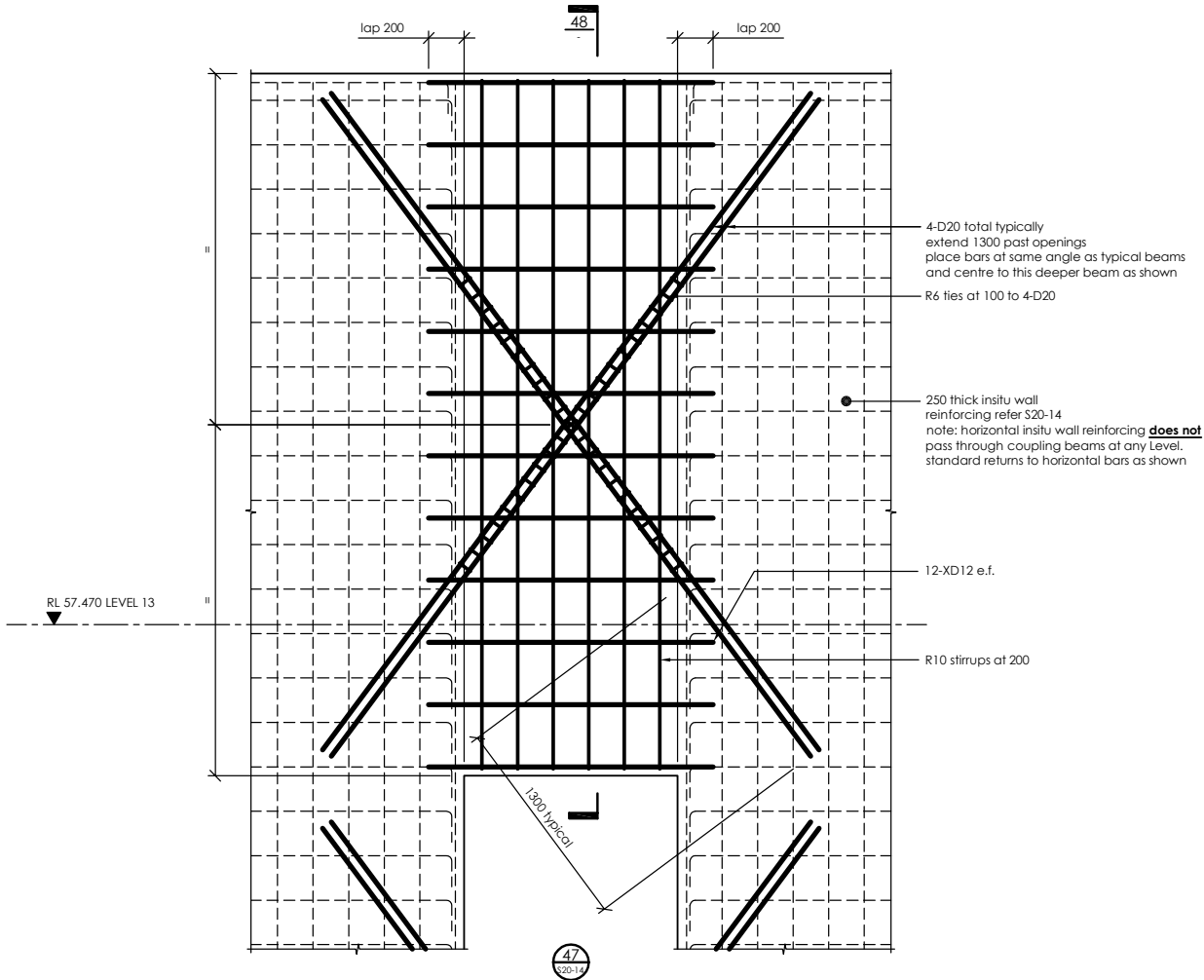
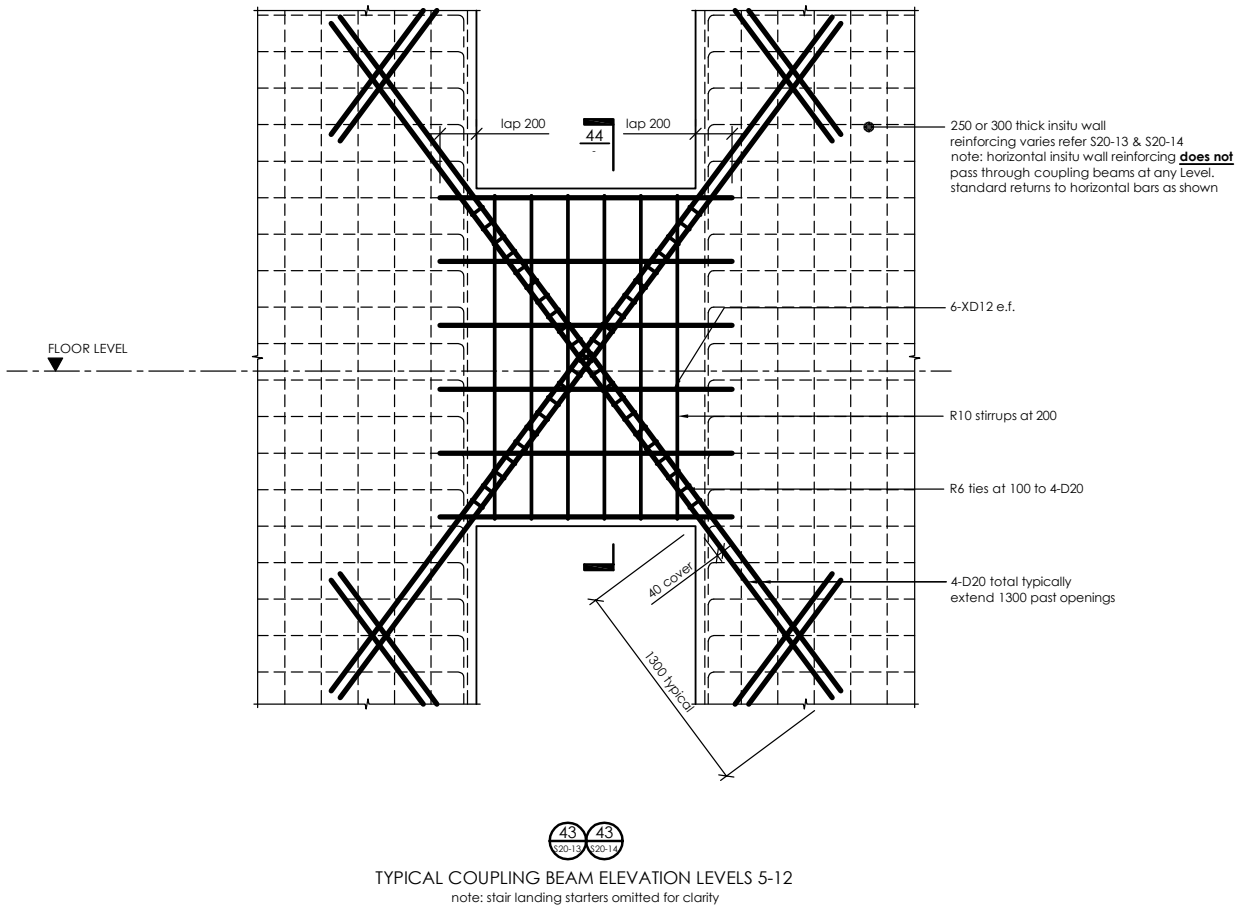
WARNERS NOVOTEL  
CHRISTCHURCH

DRAWING TITLE:

PRECAST PANEL/WALL  
TYPICAL DETAILS  
SHEET 4 OF 6

DRAWN: GPW	SCALE:	
ENGINEER: AJW	1:20/5 @ A1	
CHECKED: CBL	1:40/10 @ A3	
FILE: 106019	DRAWING NO. S22-4	REV. A

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1	31/05/07	CONSENT ISSUE	GPW
REV.	DATE	AMENDMENT	BY

ARCHITECT:



lewis bradford  
CONSULTING ENGINEERS

PROJECT:

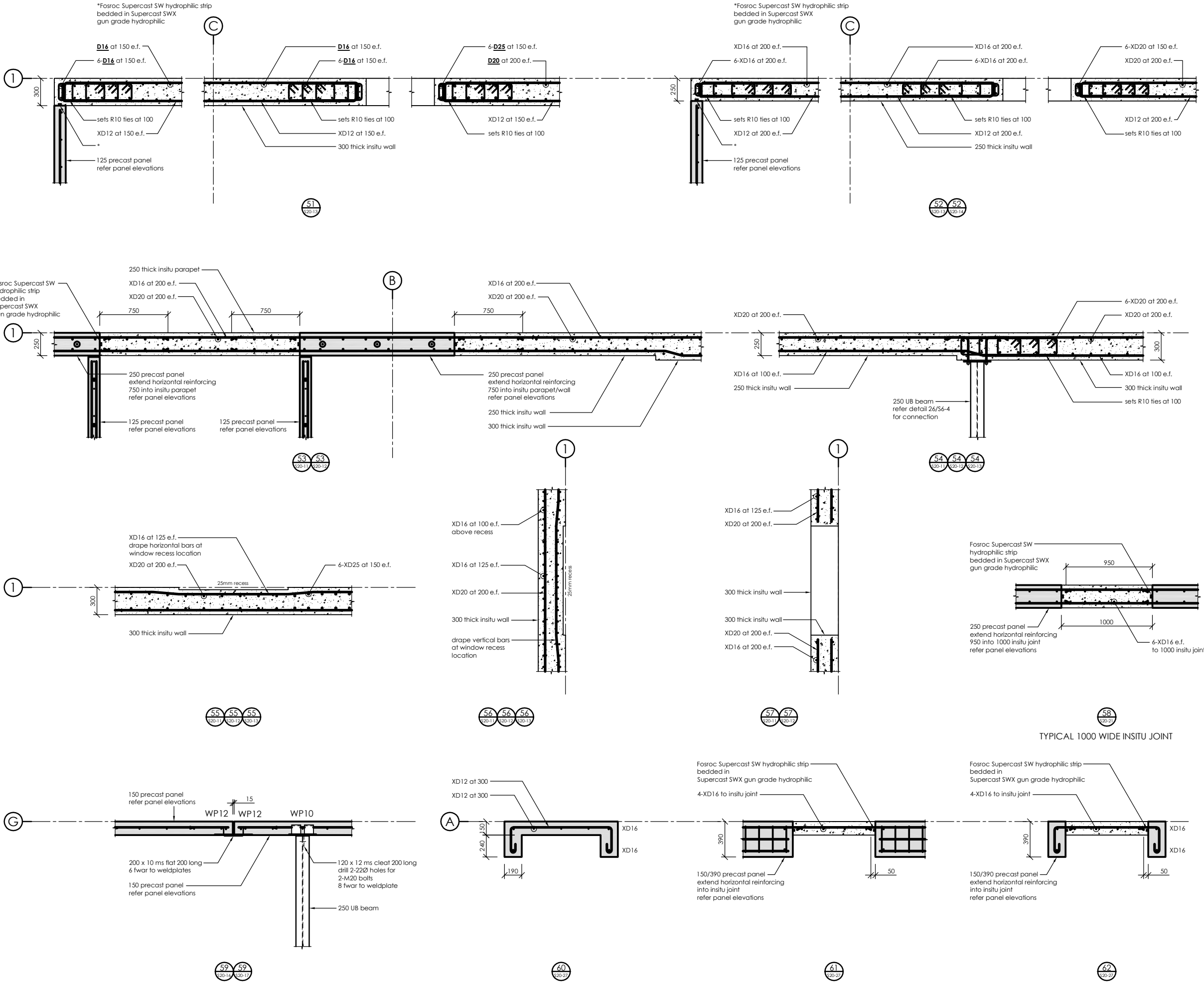
WARNERS NOVOTEL  
CHRISTCHURCH

DRAWING TITLE:

PRECAST PANEL/WALL  
TYPICAL DETAILS  
SHEET 5 OF 6

DRAWN: GPW	SCALE:	
ENGINEER: AJW	1:20 @ A1	
CHECKED: CBL	1:40 @ A3	
FILE: 106019	DRAWING NO. S22-5	REV. A

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NOTES :

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Refer Architects drawings for all set out dimensions, opening sizes, slab set downs, rebates, sealants etc.

Refer S21 series for typical details of 125mm thick precast panels

Refer S22 series for typical details of insitu walls and structural precast panels greater than 125mm thick

REINFORCING BAR LAPS		
Bar size	Lap length concrete	Lap length concrete block
D12	500 mm	500 mm
D16	650 mm	650 mm
D20	800 mm	800 mm
D25	1000 mm	1000 mm
D32	1300 mm	1300 mm
XD12	700 mm	850 mm
XD16	800 mm	1100 mm
XD20	1000 mm	1400 mm
XD25	1250 mm	1750 mm
XD32	1600 mm	2250 mm

Typically all insitu concrete wall elements to be 30 MPa concrete unless noted otherwise.

Typically all precast concrete and precast beams to be 35 MPa concrete unless noted otherwise.

Unless shown otherwise all horizontal and vertical precast panel joints to be 15mm.

All insitu interfaces and construction joints shall be thoroughly roughened to 5mm amplitude.

All precast to insitu interfaces and grouted joints shall be thoroughly roughened to 5mm amplitude.

Typically horizontal bars in double reinforced panels are to be outside vertical reinforcing 35mm cover to outside bars typical

The lifting and transporting etc., of all panels is the responsibility of the Contractor, this includes the provision of strong backs as required (refer Specification).

The Contractor shall provide two copies of the shop drawings for precast concrete work to the Engineer for approval 14 days prior to manufacture.

A	22/01/08	CONSTRUCTION ISSUE	GPW
1			GPW
REV.	DATE	AMENDMENT	BY

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PROJECT:

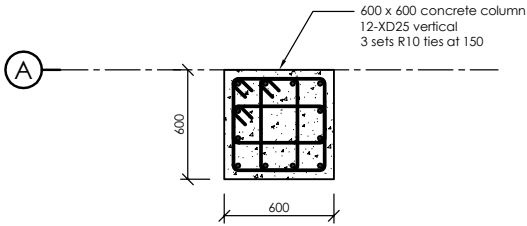
WARNERS NOVOTEL  
CHRISTCHURCH

DRAWING TITLE:

PRECAST PANEL/WALL  
TYPICAL DETAILS  
SHEET 6 OF 6

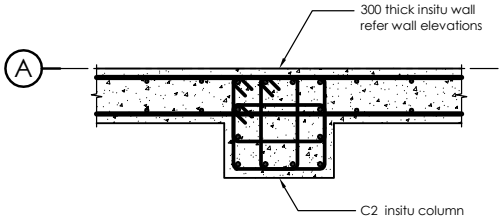
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FILE: 106019	DRAWING NO. S22-6	REV. A

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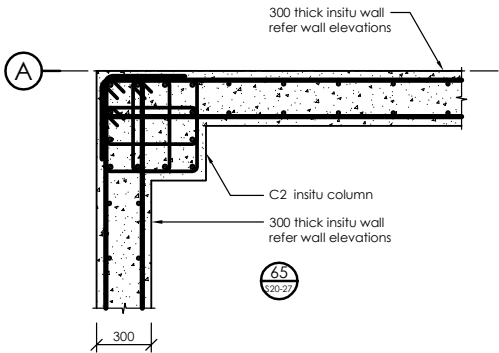


63  
S20-27

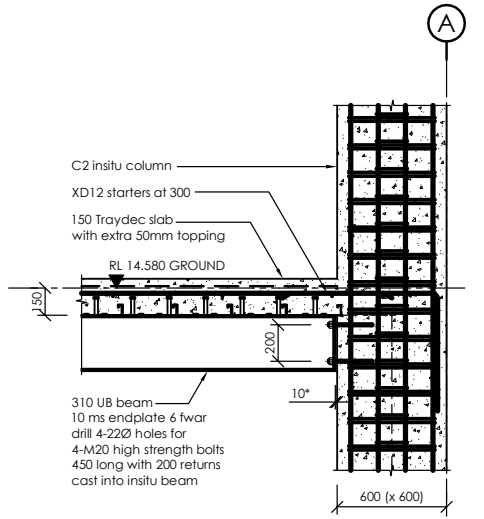
C2 COLUMN SECTION



64  
S20-27



65  
S20-27



66  
S20-27

\*provide 10mm steel shim and drypack mortar

refer also detail S/S2-2

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All exposed ends of RHS members to be capped with ex. 10mm rms plate unless shown otherwise.

All plates shall be 10mm minimum unless noted otherwise.

Unless shown otherwise, all welds are to be 6 fillet weld all round refer to the Specification for type and class of weld.

Mild steel flat anchors to weldplates to have minimum bend radius of 2.5 x thickness of flat and bent around a former pin.

All bolts and nuts shall be grade 8.8 high strength.

All holding down bolts and other fixing devices, shall have a minimum yield stress of 240 MPa unless noted otherwise.

Provide 200 nom. Nelson shear studs 100 long to all steel beams welded in accordance with AS 1554 Part 2. at 150 centres for all primary UC beams at 200 centres for all secondary UB beams

All exterior steel work to be hot dip galvanised in accordance with AS 1650, unless noted otherwise.

All load bearing steel work (including columns, beams, etc.) will require specific fire rating. Refer to Fire Engineer and/or Architect for requirements, details, and fire rating options.

All dry pack mortar/grout shall have a compressive strength of at least 40 MPa.

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REV.	DATE	AMENDMENT	BY
A	22/01/08	CONSTRUCTION ISSUE	GPW
4	31/05/07	CONSENT ISSUE	GPW
3	22/03/07	TENDER UPDATE ISSUE	GPW
2	31/01/07	TENDER ISSUE	GPW
1	21/12/06	FOR CLIENT REVIEW	GPW

ARCHITECT:



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CONSULTING ENGINEERS

PROJECT:

WARNERS NOVOTEL  
CHRISTCHURCH

DRAWING TITLE:

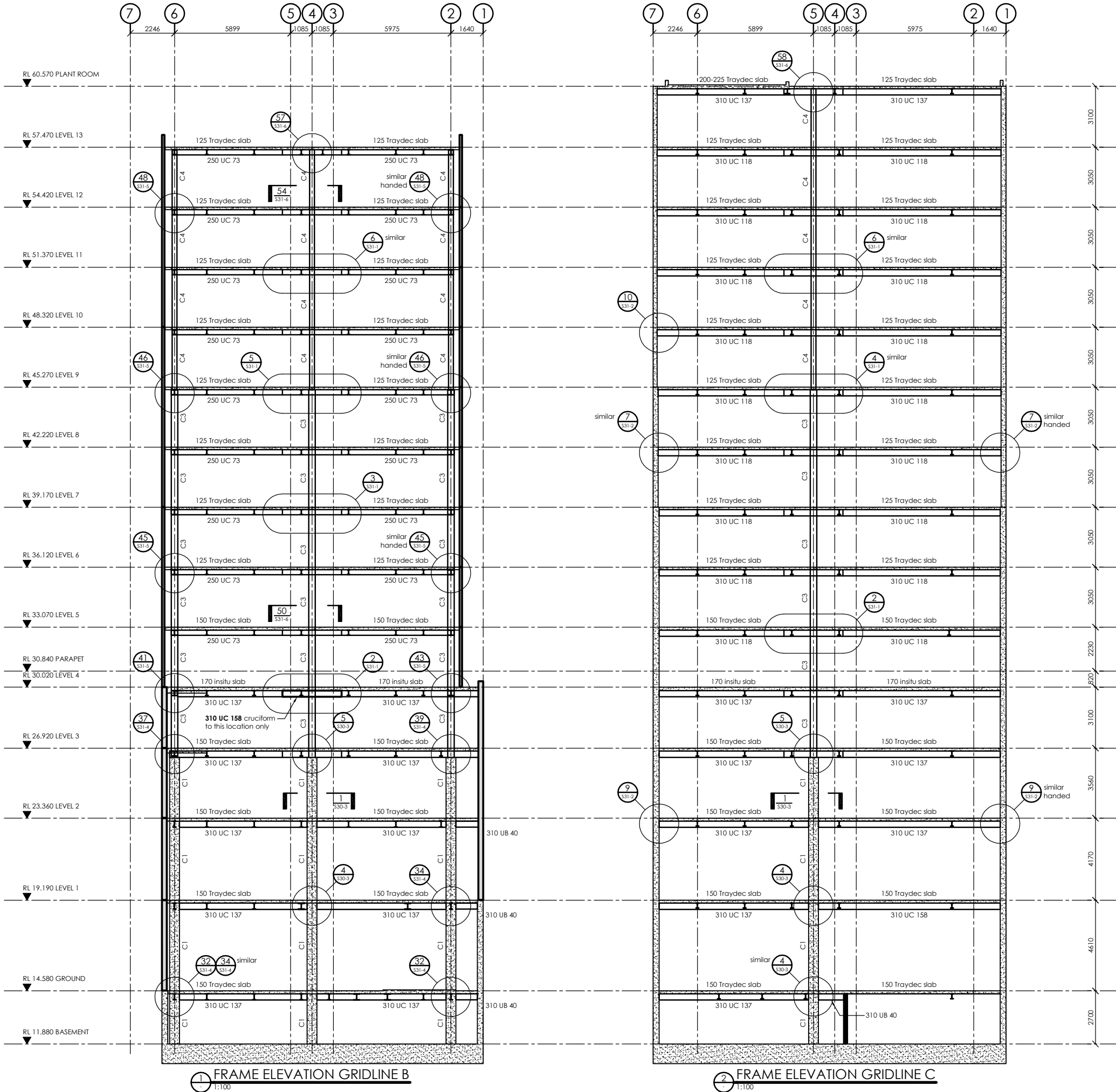
FRAME ELEVATIONS  
GRIDLINES B & C

DRAWN: GPW	SCALE:	
ENGINEER: AJW	1:100 @ A1	
CHECKED: CBL	1:200 @ A3	
FILE: 106019	DRAWING NO. S30-1	REV. A

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COLUMN LEGEND

- C1 500 x 500 concrete column (40MPa concrete)
- C2 600 x 600 concrete column
- C3 310 UC 158 steel column
- C4 250 x 9 SHS steel column
- C5 150 x 9 SHS steel column
- C6 89 x 6 SHS steel column
- C7 310 UC 198 steel column
- C8 200 UC 52 steel column
- C9 125 x 9 SHS steel column
- C10 100 x 9 SHS steel column



1 FRAME ELEVATION GRIDLINE B  
1:100

2 FRAME ELEVATION GRIDLINE C  
1:100

C1	500 x 500 concrete column (40MPa concrete)
C2	600 x 600 concrete column
C3	310 UC 158 steel column
C4	250 x 9 SHS steel column
C5	150 x 9 SHS steel column
C6	89 x 6 SHS steel column
C7	310 UC 198 steel column
C8	200 UC 52 steel column
C9	125 x 9 SHS steel column
C10	100 x 9 SHS steel column



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Provide 200 nom. Nelson shear studs 100 long  
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AS 1554 Part 2.  
at 150 centres for all primary UC beams  
at 200 centres for all secondary UB beams

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2	31/01/07	TENDER ISSUE	GPW
1	21/12/06	FOR CLIENT REVIEW	GPW
REV.	DATE	AMENDMENT	BY

ARCHITECT:



**lewis bradford**  
CONSULTING ENGINEERS

PROJECT:

WARNERS NOVOTEL  
CHRISTCHURCH

DRAWING TITLE:

FRAME ELEVATIONS  
GRIDLINES D & E

DRAWN: GPW	SCALE: 1:100 @ A1 1:200 @ A3	
ENGINEER: AJW		
CHECKED: CBL		
FILE: 106019	DRAWING NO. S30-2	REV. A



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PROJECT:

WARNERS NOVOTEL  
CHRISTCHURCH

DRAWING TITLE:

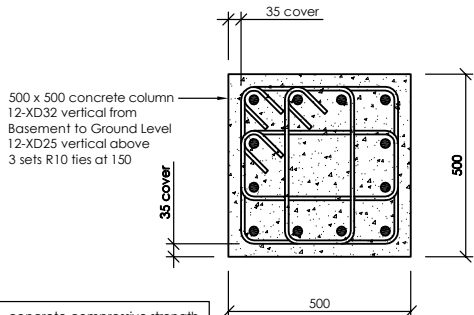
FRAME ELEVATION  
GRIDLINE F & TYPICAL  
C1 COLUMN DETAILS

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FILE: 106019	DRAWING NO. S30-3
	REV. A

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COLUMN LEGEND

- C1 500 x 500 concrete column (40MPa concrete)
- C2 600 x 600 concrete column
- C3 310 UC 158 steel column
- C4 250 x 9 SHS steel column
- C5 150 x 9 SHS steel column
- C6 89 x 6 SHS steel column
- C7 310 UC 198 steel column
- C8 200 UC 52 steel column
- C9 125 x 9 SHS steel column
- C10 100 x 9 SHS steel column

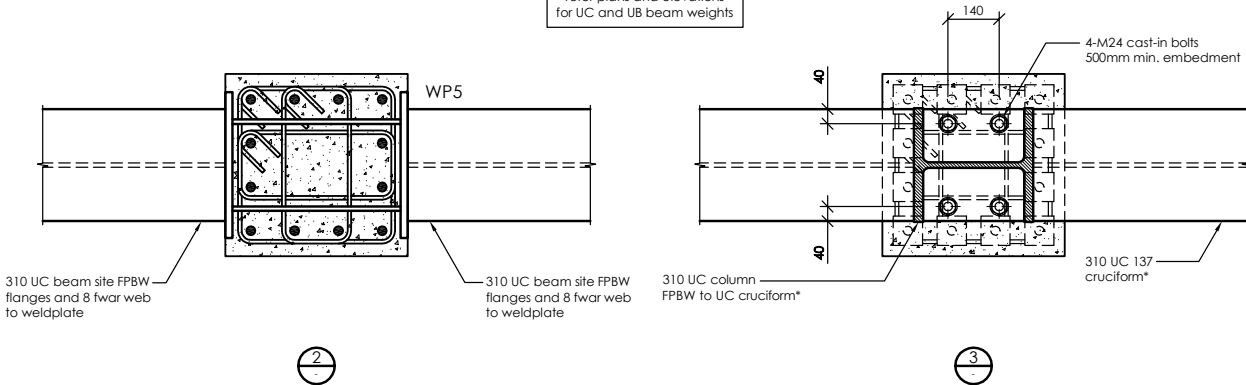


concrete compressive strength  
 $f_c = 40\text{MPa}$  to all C1 columns  
(40MPa concrete strength to extend through floor levels)

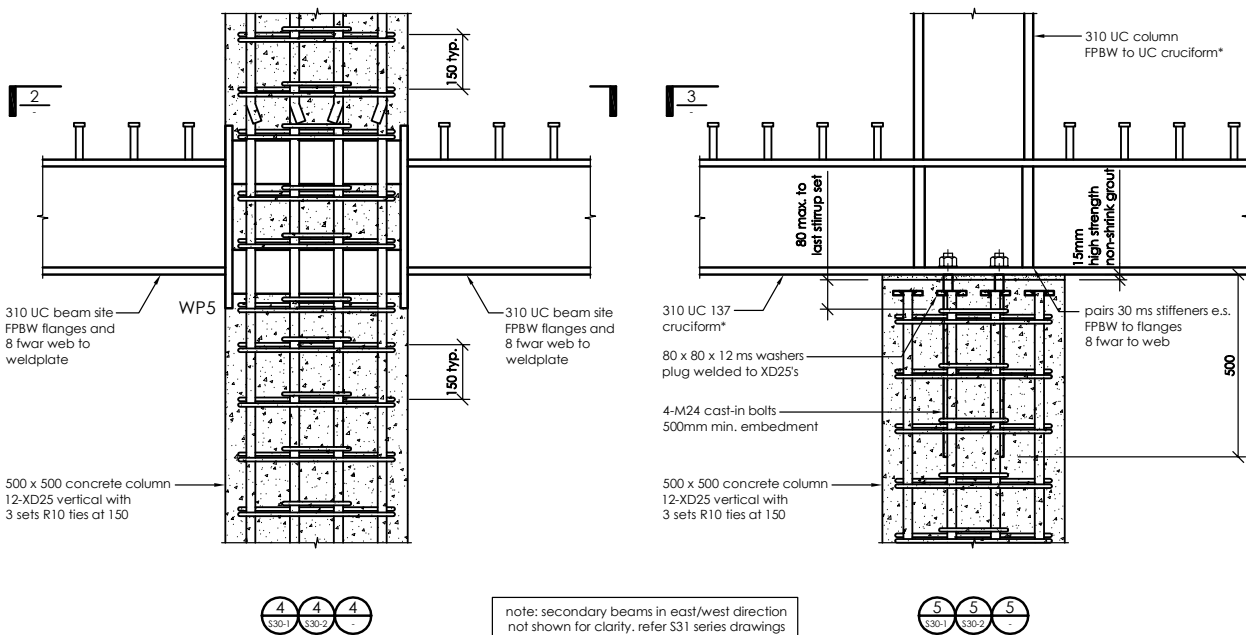
refer Architect's details for any column guards required

C1 COLUMN SECTION  
1:10

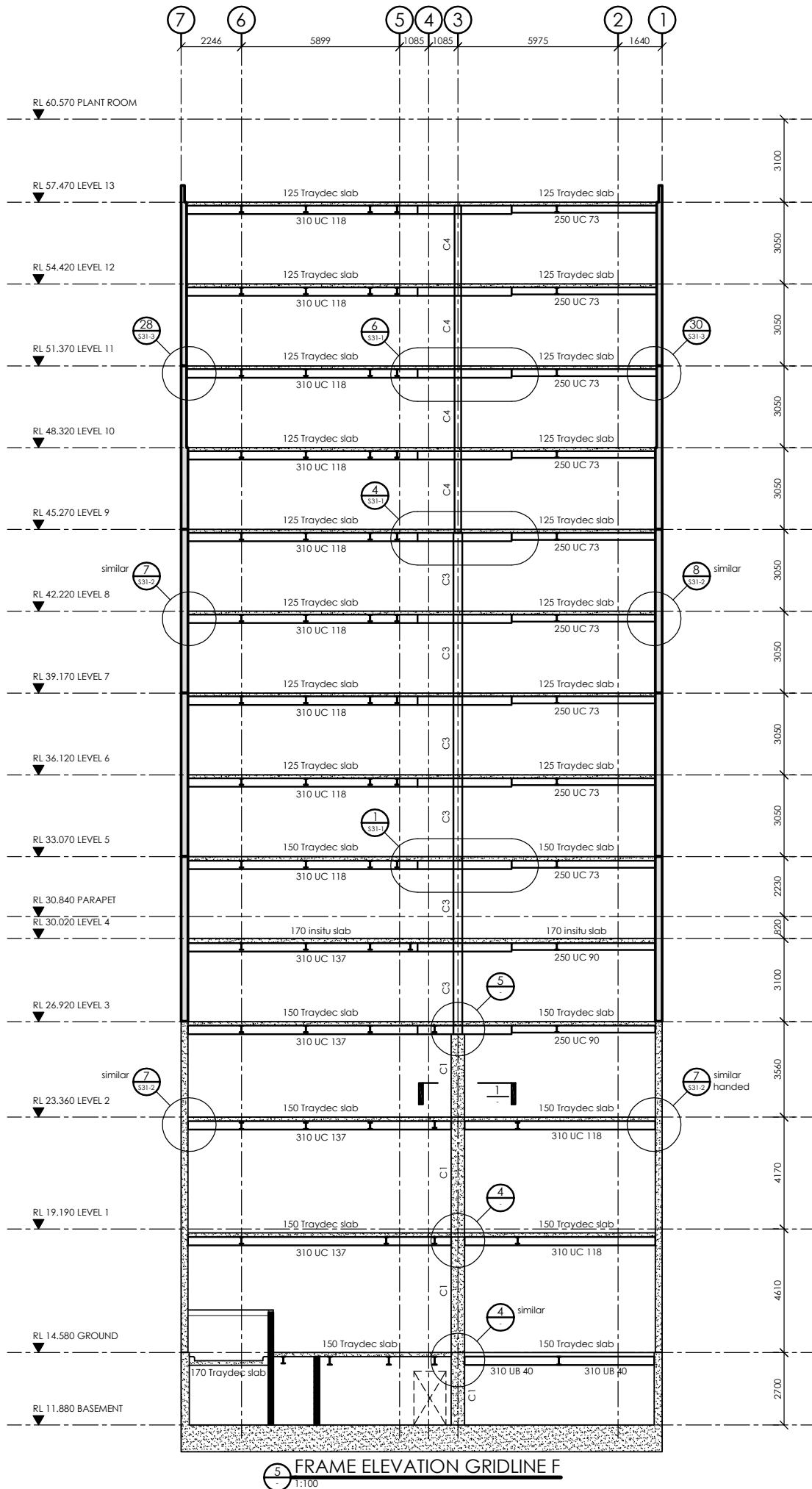
refer plans and elevations for UC and UB beam weights



\* refer S31 series drawings for full extent of cruciform connections to UC beams



note: secondary beams in east/west direction not shown for clarity. refer S31 series drawings



FRAME ELEVATION GRIDLINE F  
1:100

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2	31/01/07	TENDER ISSUE	GPW
1	21/12/06	FOR CLIENT REVIEW	GPW

ARCHITECT:



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CONSULTING ENGINEERS

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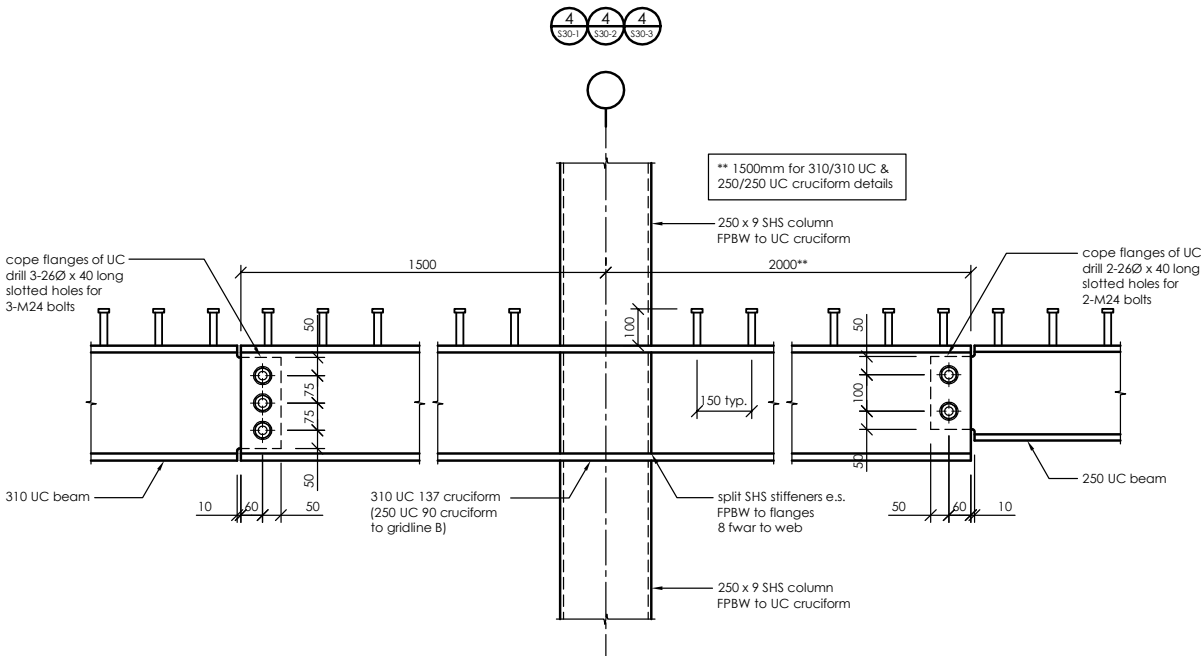
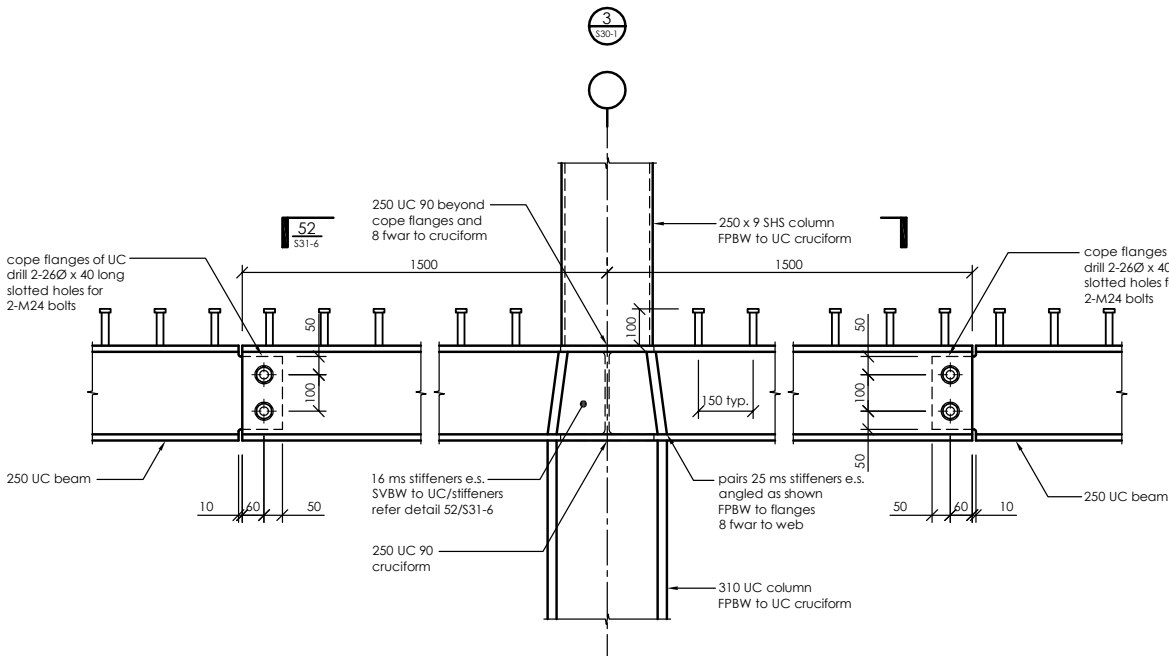
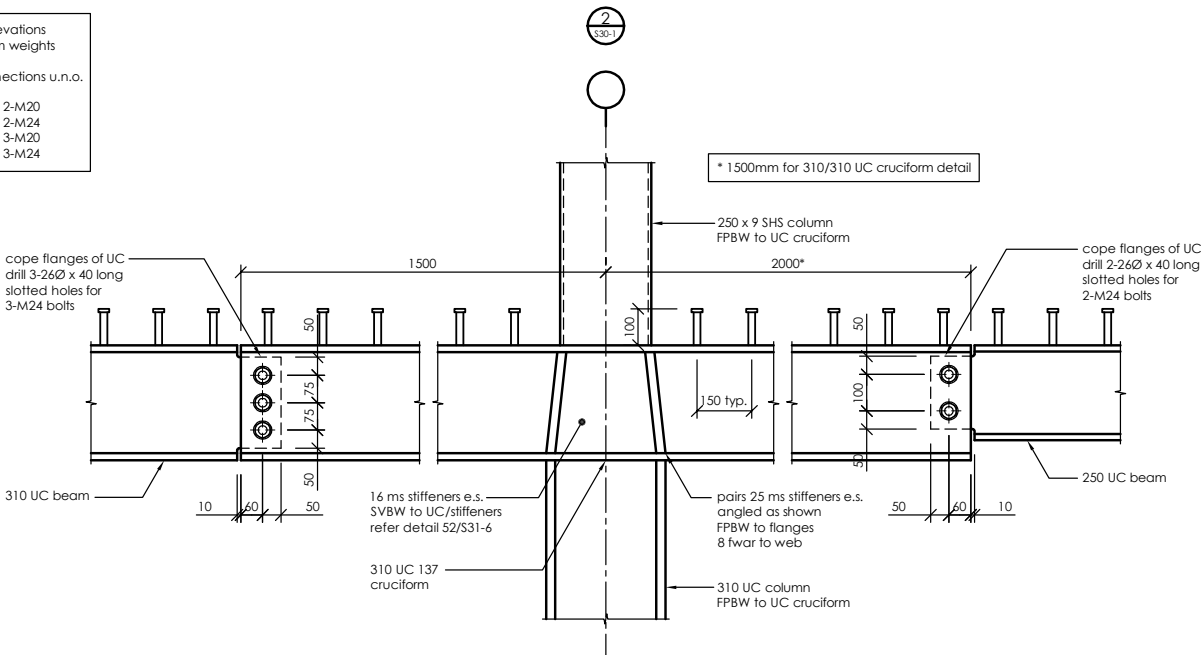
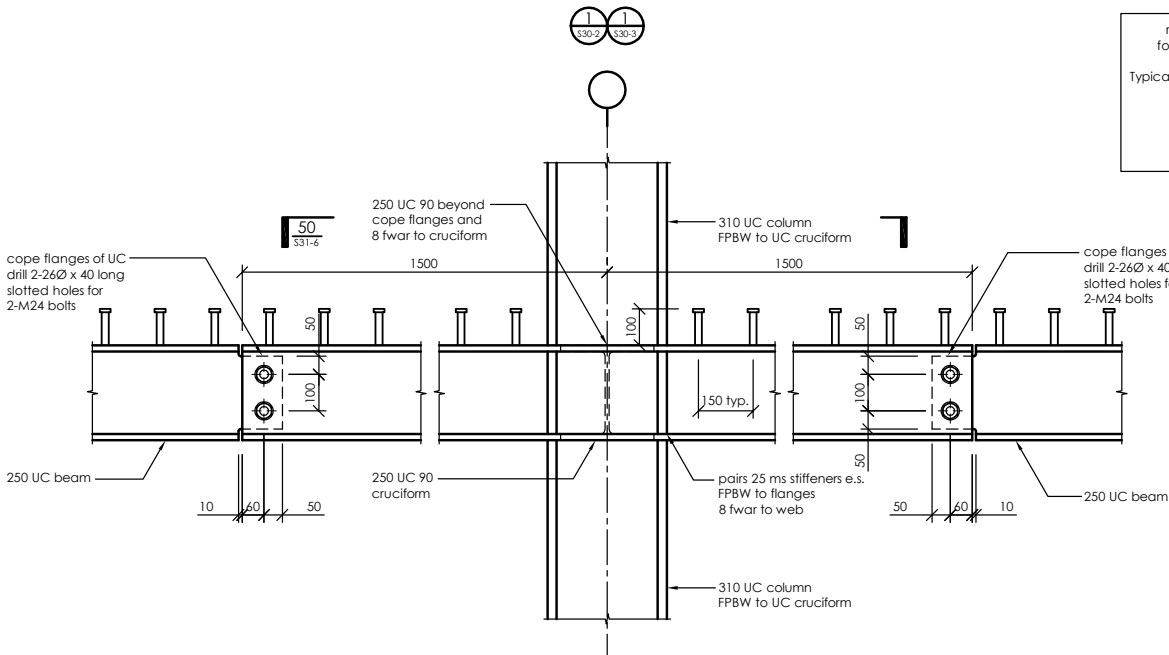
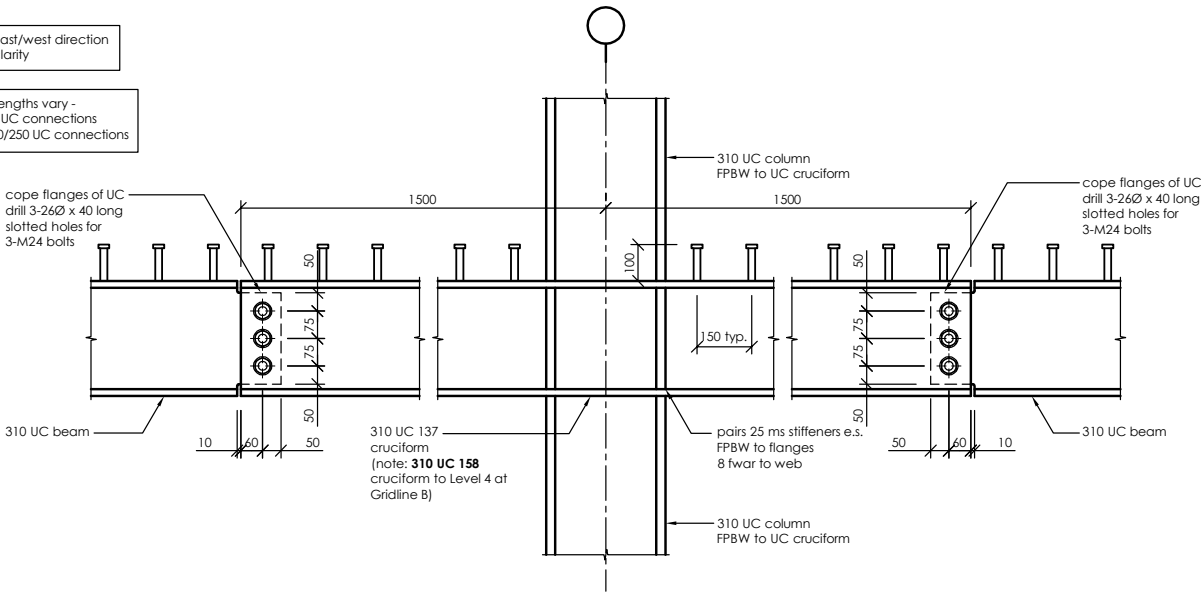
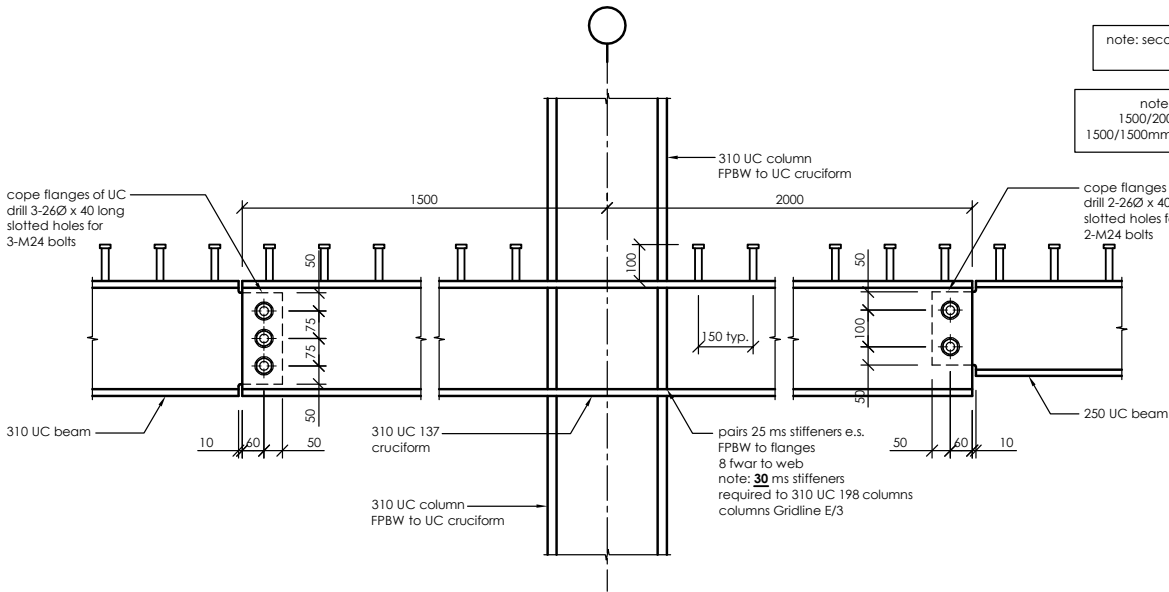
WARNERS NOVOTEL  
CHRISTCHURCH

DRAWING TITLE:

STEELWORK / FRAME DETAILS  
SHEET 1 OF 8

DRAWN:	GPW	SCALE:	1:10 @ A1
ENGINEER:	AJW		1:20 @ A3
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FILE:	106019	DRAWING NO.	S31-1
		REV.	A

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All exterior steel work to be hot dip galvanised in accordance with AS 1650, unless noted otherwise.

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All dry pack mortar/grout shall have a compressive strength of at least 40 MPa.

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ARCHITECT:



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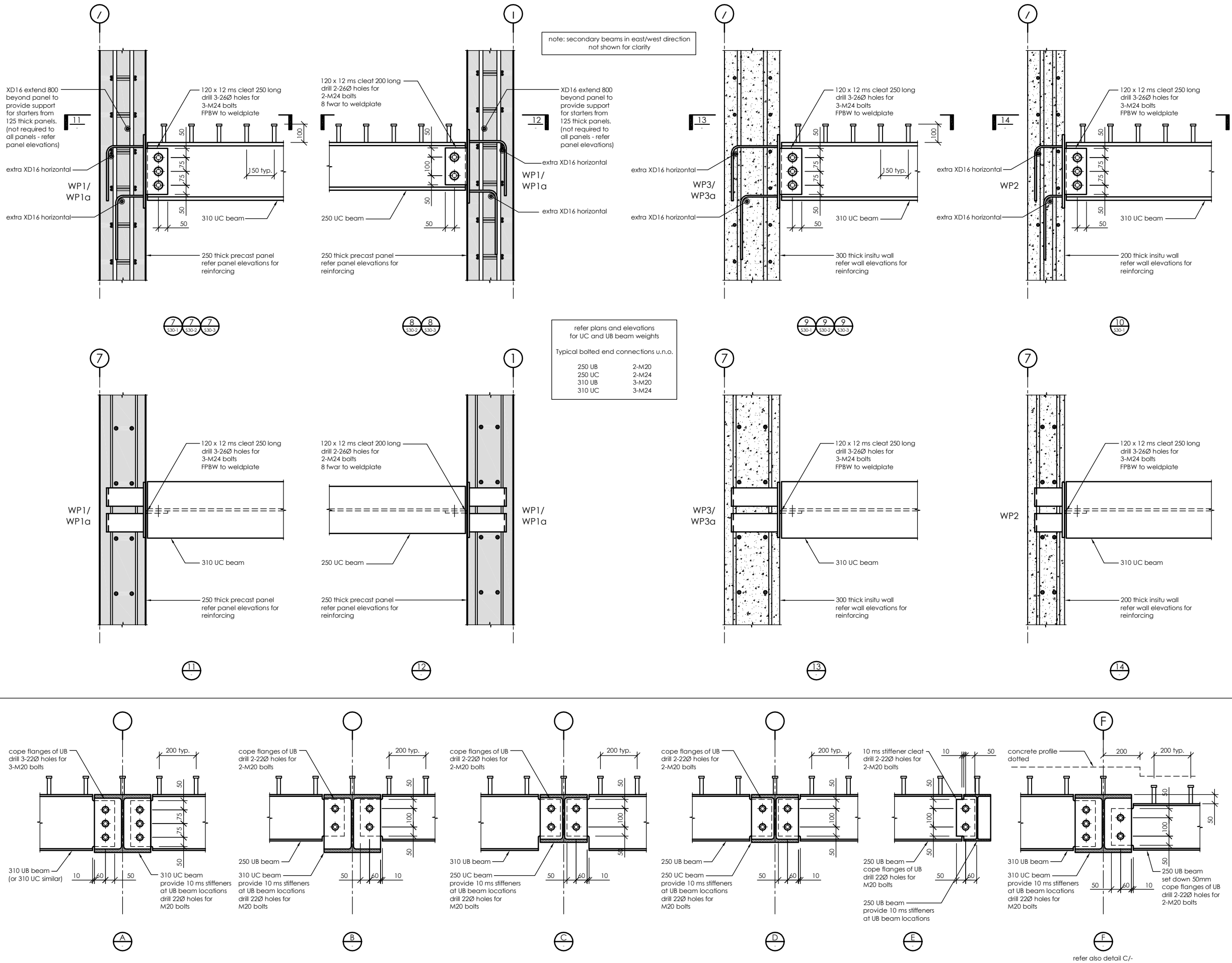
WARNERS NOVOTEL  
CHRISTCHURCH

DRAWING TITLE:

STEELWORK / FRAME DETAILS  
SHEET 2 OF 8

DRAWN:	GPW	SCALE:	1:10 @ A1
ENGINEER:	AJW		1:20 @ A3
CHECKED:	CBL		
FILE:	106019	DRAWING NO.	S31-2
		REV.	A

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TYPICAL SECONDARY UB BEAM CONNECTIONS TO PRIMARY UC BEAMS



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CHRISTCHURCH

DRAWING TITLE:

STEELWORK / FRAME DETAILS  
SHEET 3 OF 8

DRAWN: GPW	SCALE: 1:10 @ A1
ENGINEER: AJW	1:20 @ A3
CHECKED: CBL	
FILE: 106019	DRAWING NO. S31-3
	REV. A

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note: weldplate to be set down to allow 2-XD32 top & bottom to pass over Level 4 only  
elsewhere weldplates to be positioned central on UC beams as per details 20, 22 & 26

300 thick insitu wall  
refer wall elevations

2-XD32 top & bottom  
approx. 12500 long  
lap 3000 into wall

310 UC beam  
site FPBW flanges to weldplate  
8 fwar web to weldplate  
Level 4 only  
elsewhere similar to details 20, 22 & 26

refer plans and elevations  
for UC and UB beam weights

Typical bolted end connections u.n.o.

250 UB 2-M20  
250 UC 2-M24  
310 UB 3-M20  
310 UC 3-M24

300 thick insitu wall  
refer wall elevations

310 UC beam  
site FPBW flanges to weldplate  
8 fwar web to weldplate  
Level 4 only  
elsewhere similar to details 20, 22 & 26

120 x 12 ms cleat 250 long  
drill 3-260 holes for  
3-M24 bolts  
FPBW to weldplate

310 UC beam

250 thick insitu wall  
refer wall elevations

120 x 12 ms cleat 250 long  
drill 3-260 holes for  
3-M24 bolts  
FPBW to weldplate

310 UC beam

120 x 12 ms cleat 250 long  
drill 3-260 holes for  
3-M24 bolts  
FPBW to weldplate

310 UC beam

400 thick insitu wall  
refer wall elevations

120 x 12 ms cleat 250 long  
drill 3-260 holes for  
3-M24 bolts  
FPBW to weldplate

310 UC beam

120 x 12 ms cleat 250 long  
drill 3-260 holes for  
3-M24 bolts  
FPBW to weldplate

310 UC beam

200 thick insitu wall  
refer wall elevations

120 x 12 ms cleat 250 long  
drill 3-260 holes for  
3-M24 bolts  
FPBW to weldplate

310 UC beam

extra XD16  
horizontal

extra XD16  
horizontal

200 thick precast panel  
refer panel elevations for  
reinforcing

310 UC beam

200 thick insitu wall  
refer wall elevations

120 x 12 ms cleat 250 long  
drill 3-260 holes for  
3-M24 bolts  
FPBW to weldplate

310 UC beam

200 thick precast panel  
refer panel elevations for  
reinforcing

120 x 12 ms cleat 200 long  
drill 3-260 holes for  
2-M24 bolts  
8 fwar to weldplate

250 UC beam

200 thick precast panel  
refer panel elevations for  
reinforcing

XD16 extend 800 beyond panel to provide support  
for starters from 125 thick panels.  
(not required to all panels - refer panel elevations)

extra XD16  
horizontal

extra XD16  
horizontal

250 thick precast panel  
refer panel elevations for  
reinforcing

120 x 12 ms cleat 200 long  
drill 2-260 holes for  
2-M24 bolts  
8 fwar to weldplate

250 UC beam

250 thick precast panel  
refer panel elevations for  
reinforcing

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Mild steel flat anchors to weldplates to have minimum bend radius of 2.5 x thickness of flat and bent around a former pin.

All bolts and nuts shall be grade 8.8 high strength.

All holding down bolts and other fixing devices, shall have a minimum yield stress of 240 MPa unless noted otherwise.

Provide 200 nom. Nelson shear studs 100 long to all steel beams welded in accordance with AS 1554 Part 2.  
at 150 centres for all primary UC beams  
at 200 centres for all secondary UB beams

All exterior steel work to be hot dip galvanised in accordance with AS 1650, unless noted otherwise.

All load bearing steel work (including columns, beams, etc.) will require specific fire rating. Refer to Fire Engineer and/or Architect for requirements, details, and fire rating options.

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1	31/05/07	CONSENT ISSUE	GPW
REV.	DATE	AMENDMENT	BY

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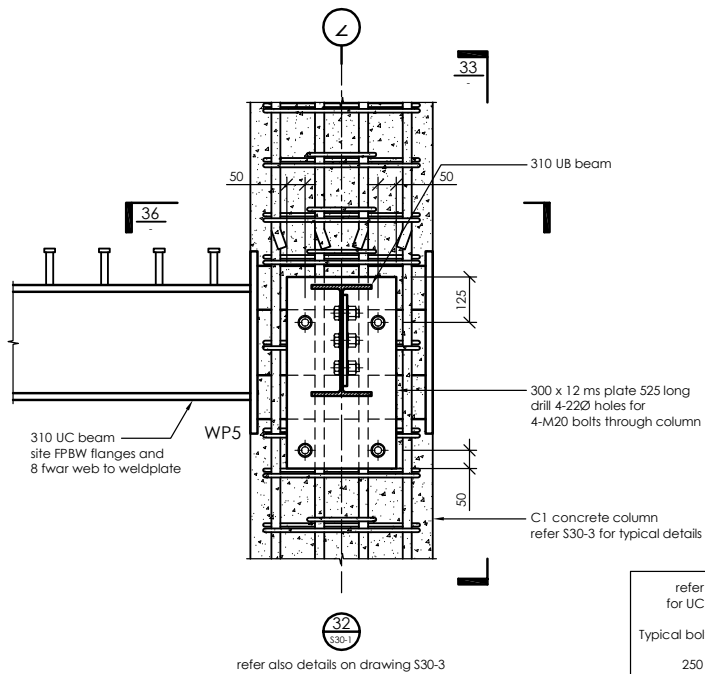
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CHRISTCHURCH

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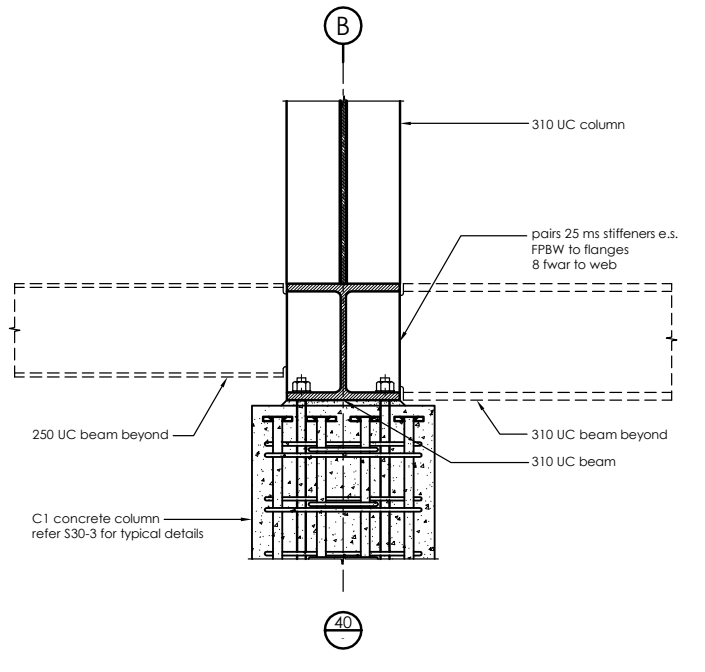
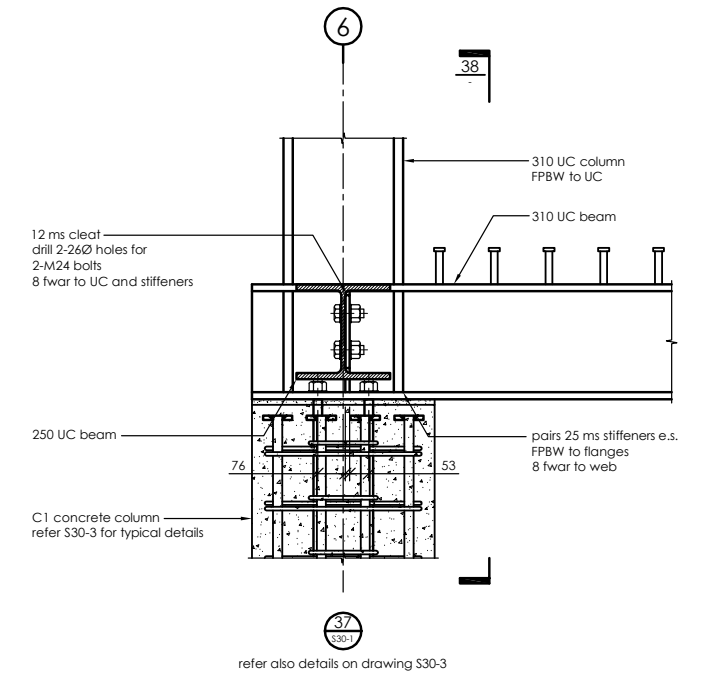
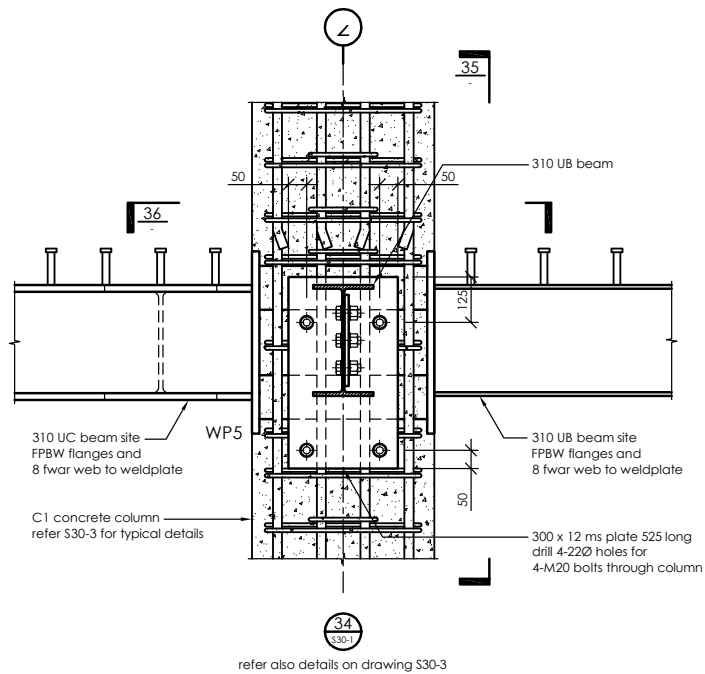
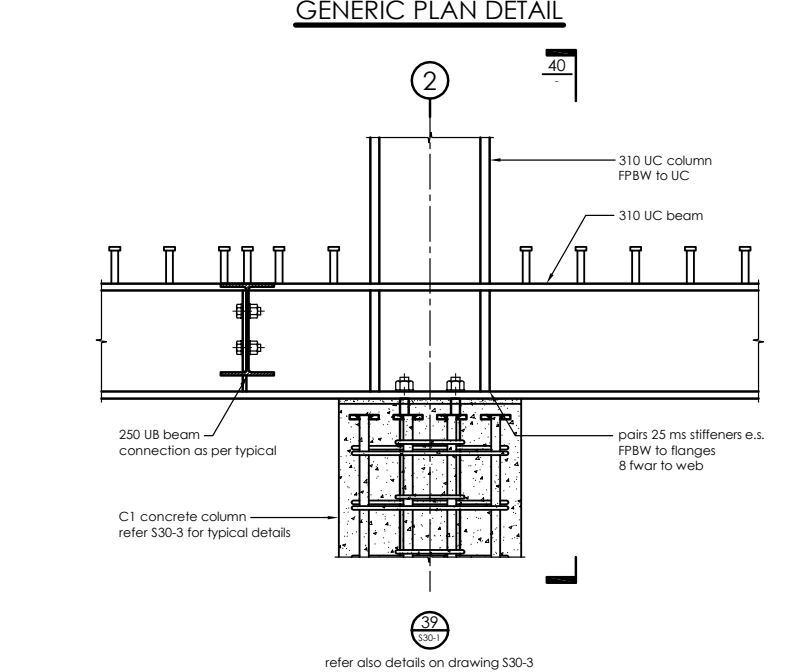
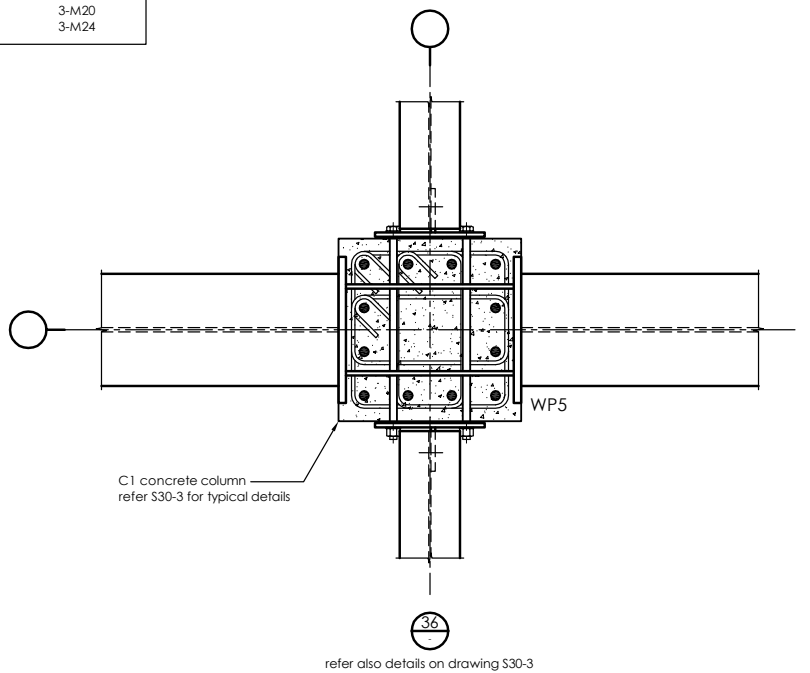
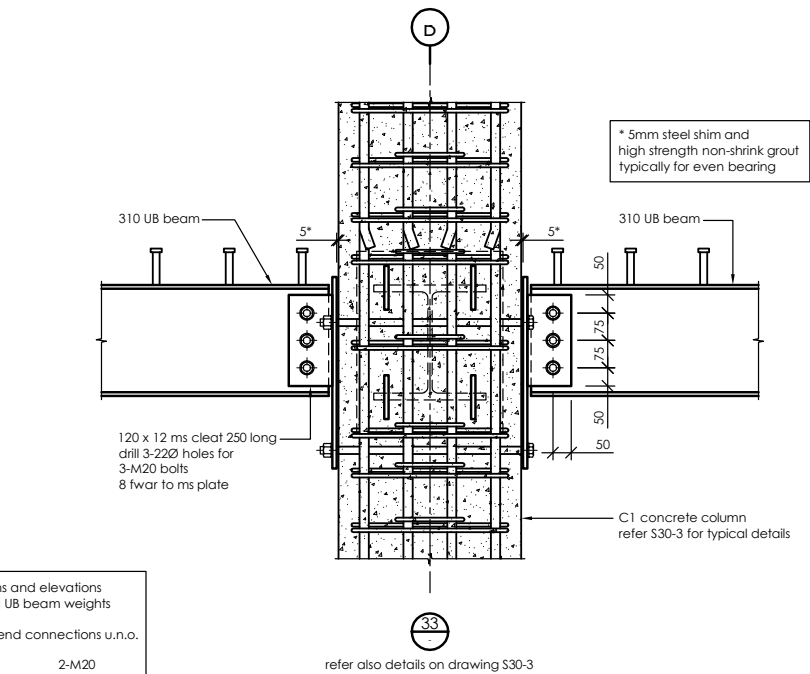
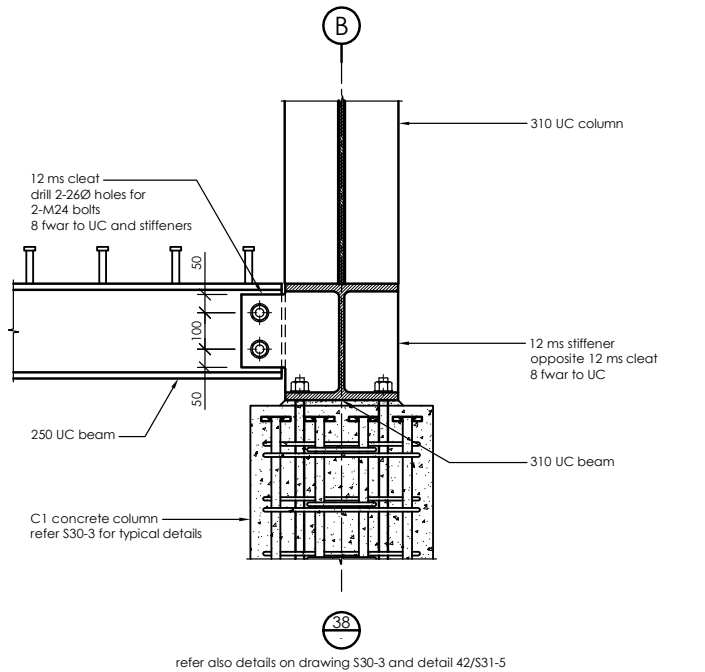
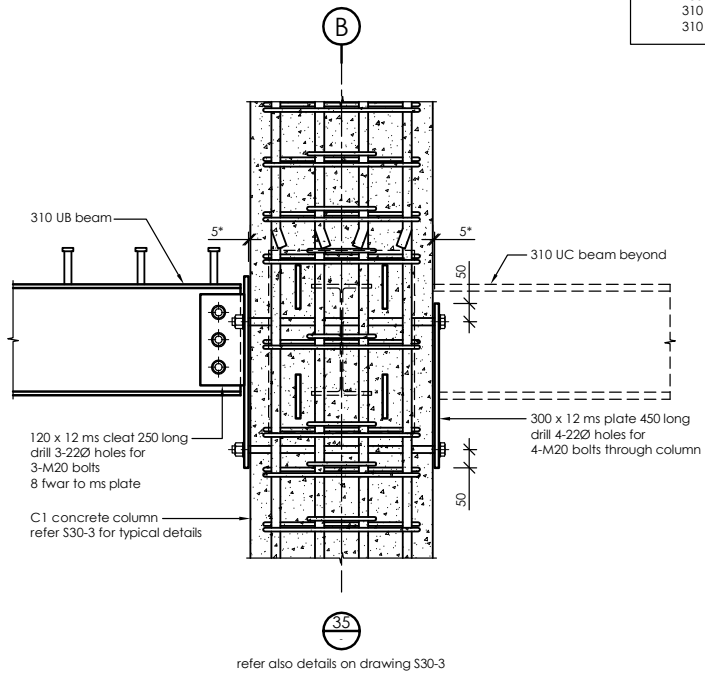
STEELWORK / FRAME DETAILS  
SHEET 4 OF 8

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FILE:	106019	DRAWING NO.	S31-4
		REV.	A

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refer plans and elevations for UC and UB beam weights	
Typical bolted end connections u.n.o.	
250 UB	2-M20
250 UC	2-M24
310 UB	3-M20
310 UC	3-M24



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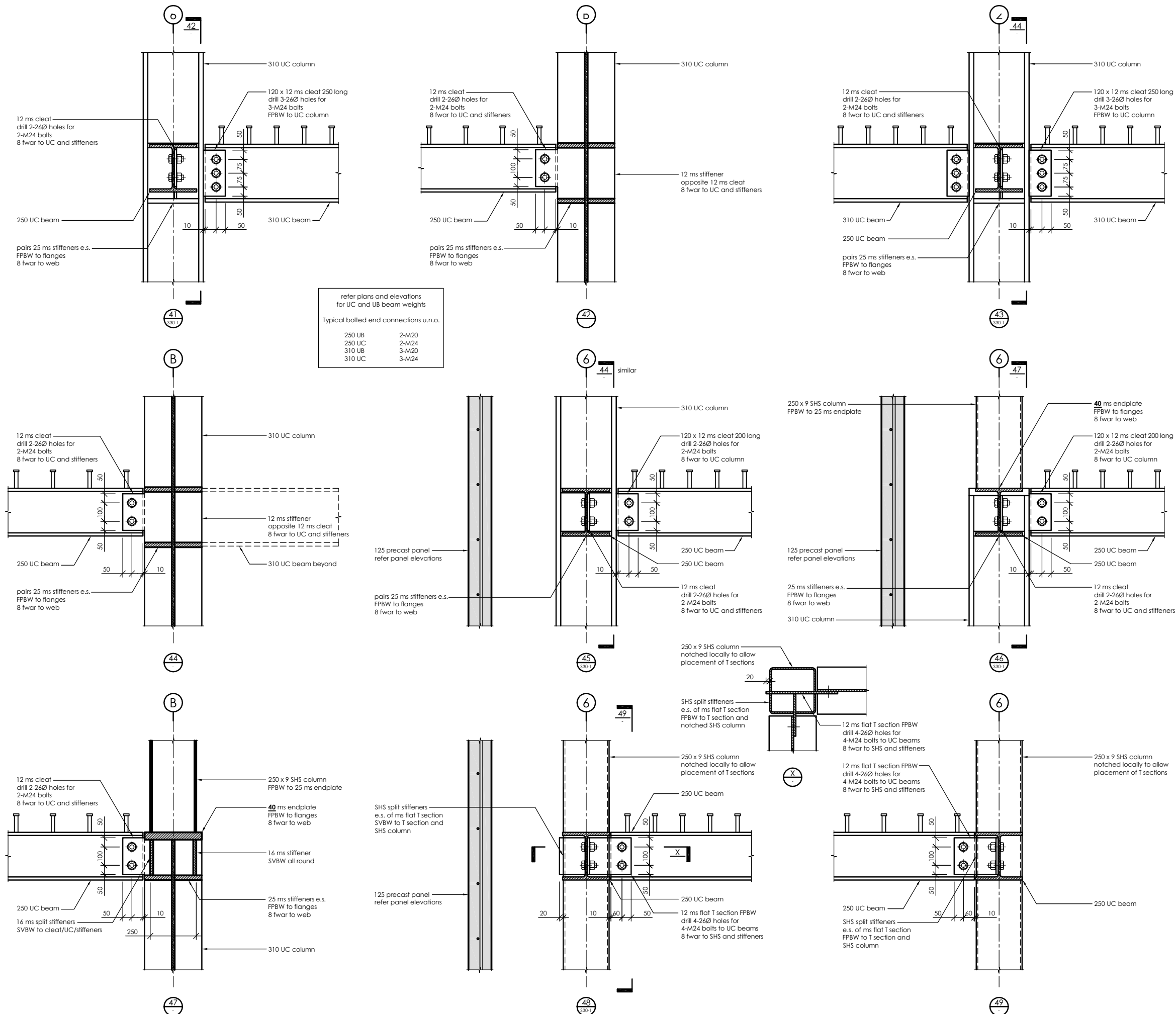
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SHEET 5 OF 8

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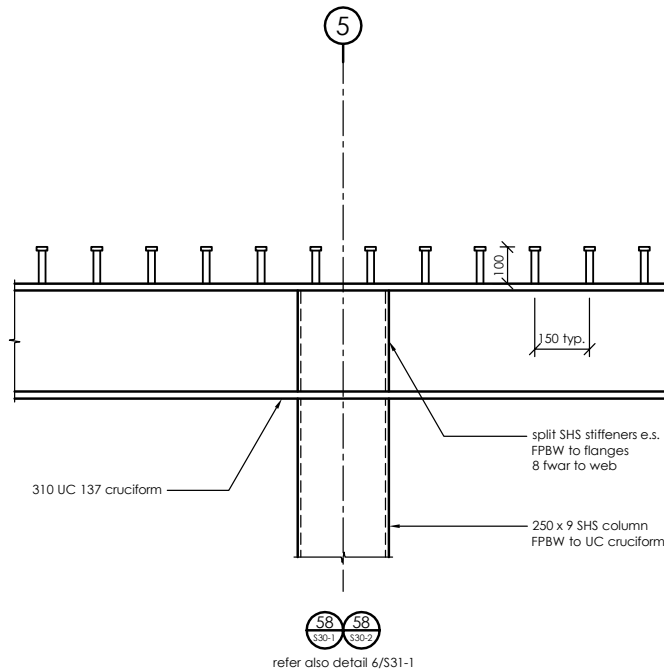
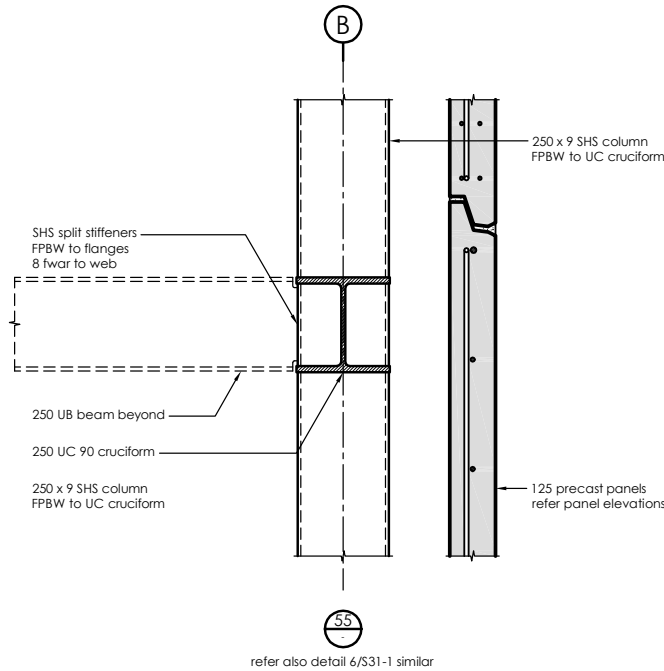
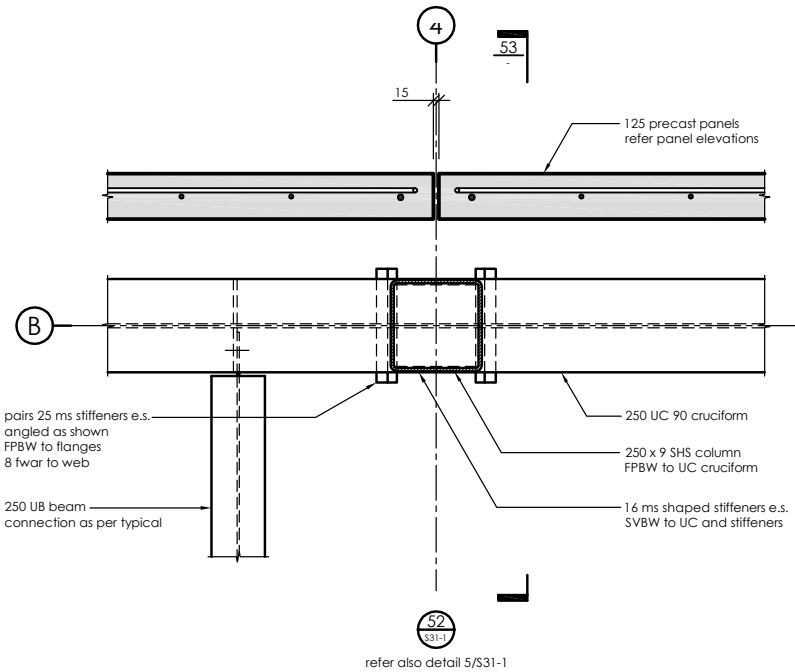
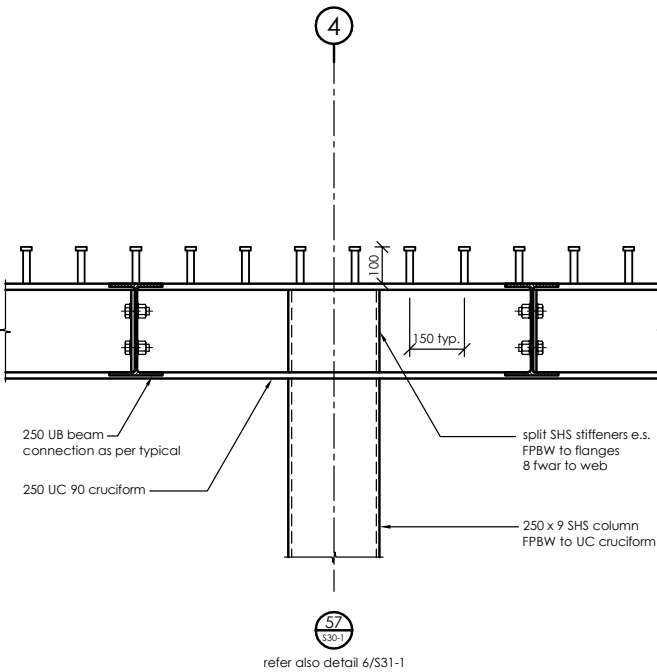
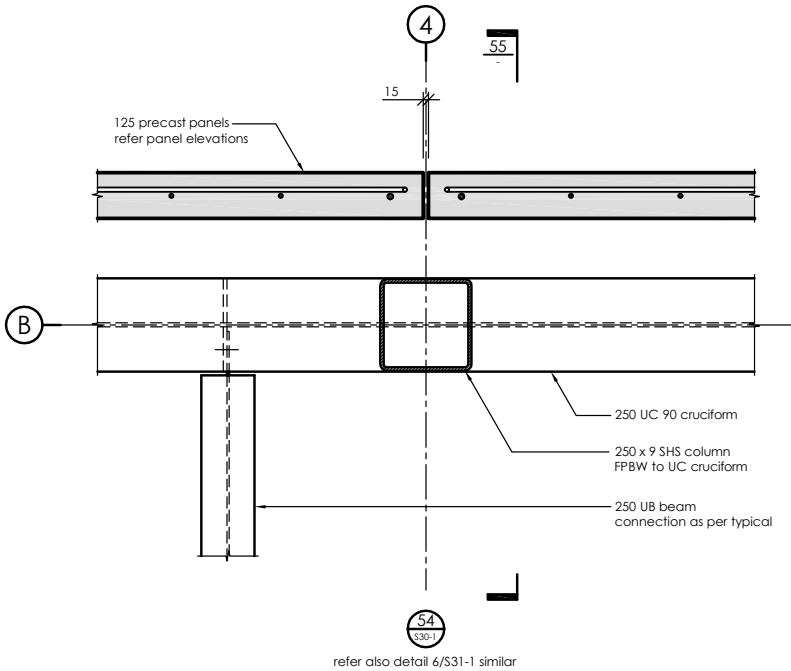
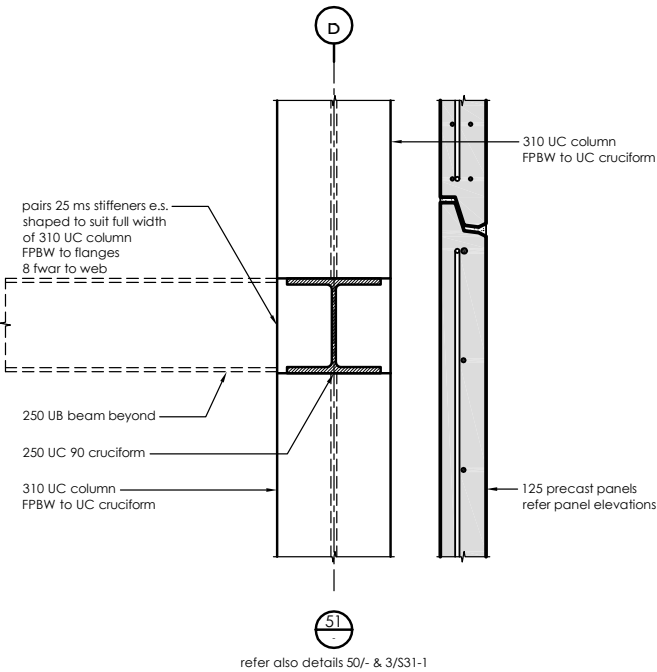
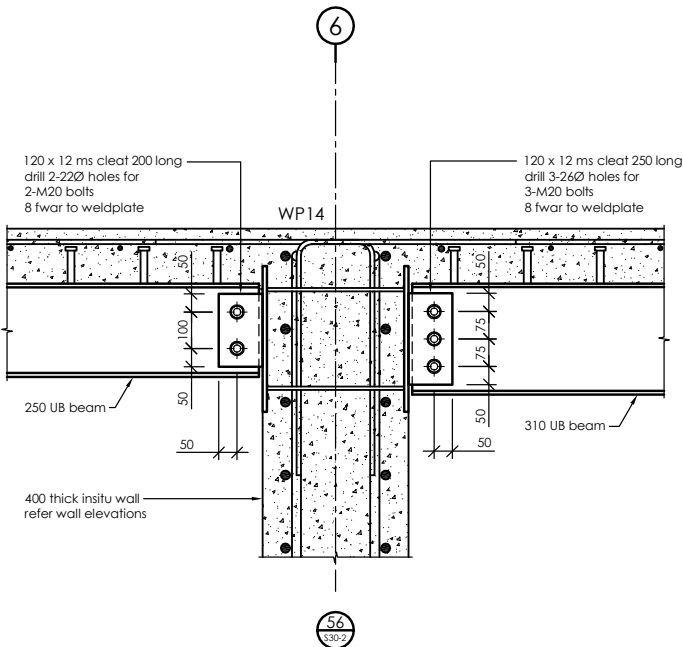
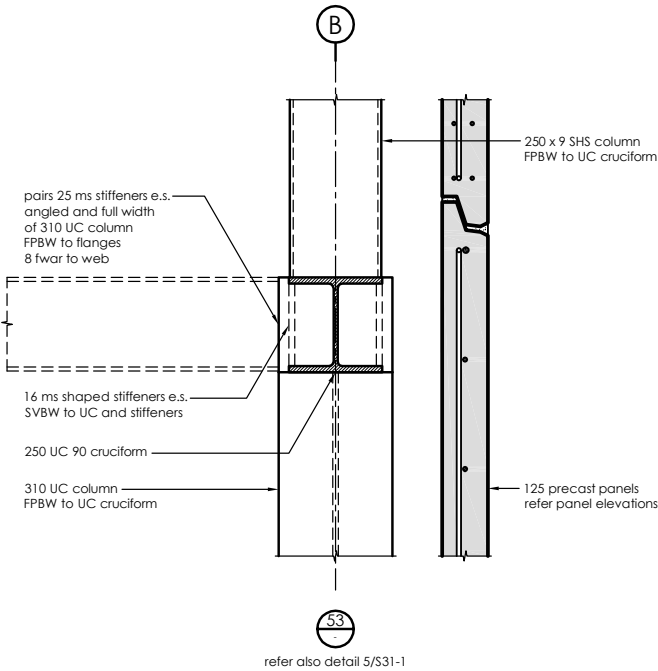
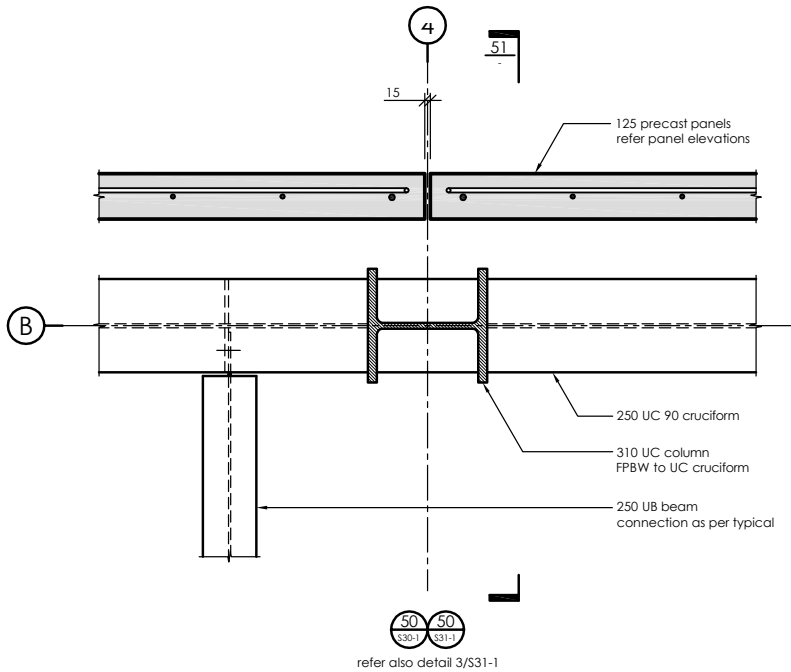
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STEELWORK / FRAME DETAILS  
SHEET 6 OF 8

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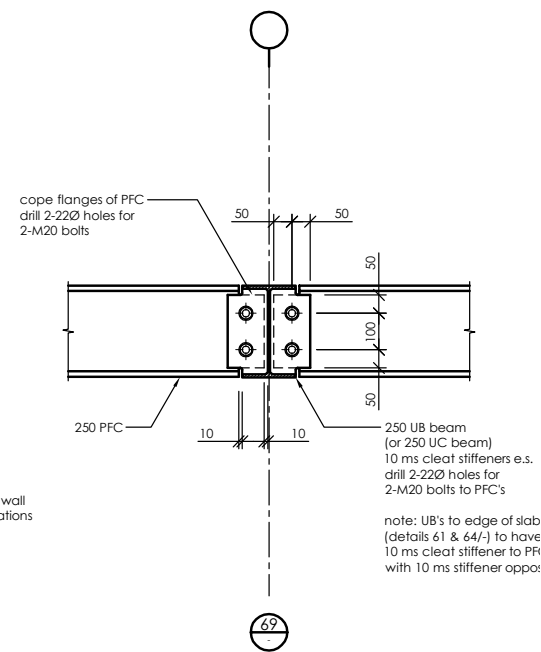
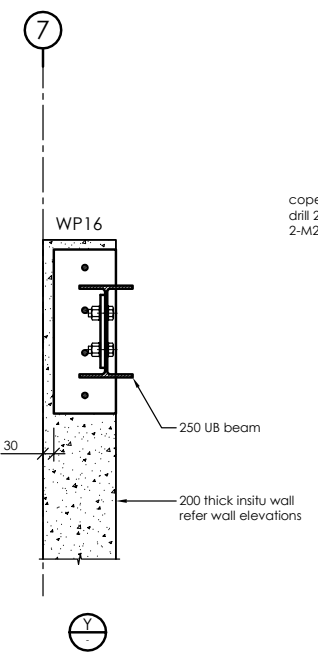
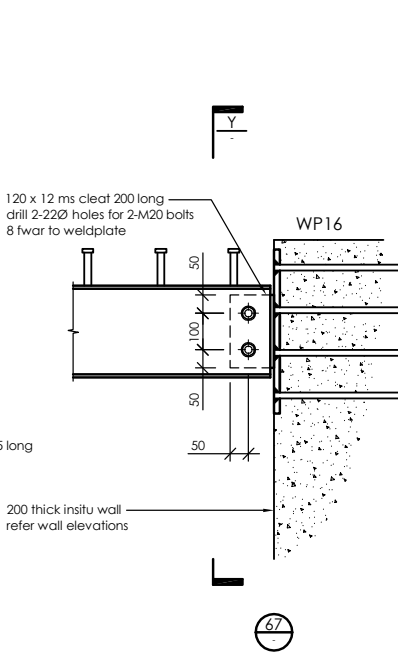
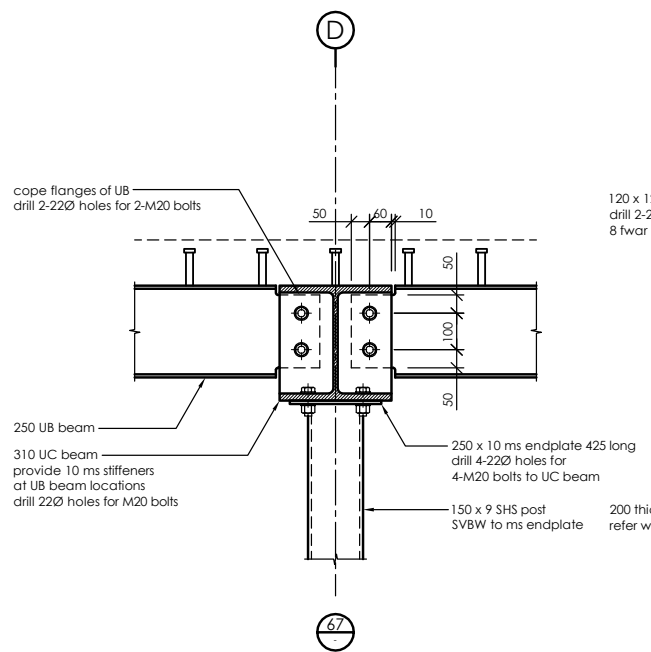
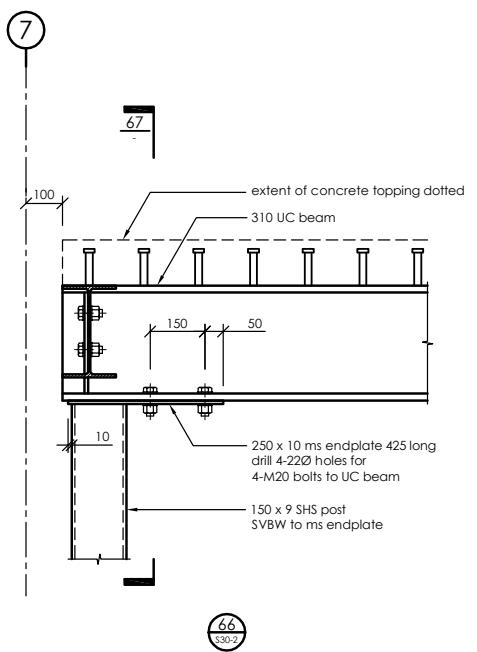
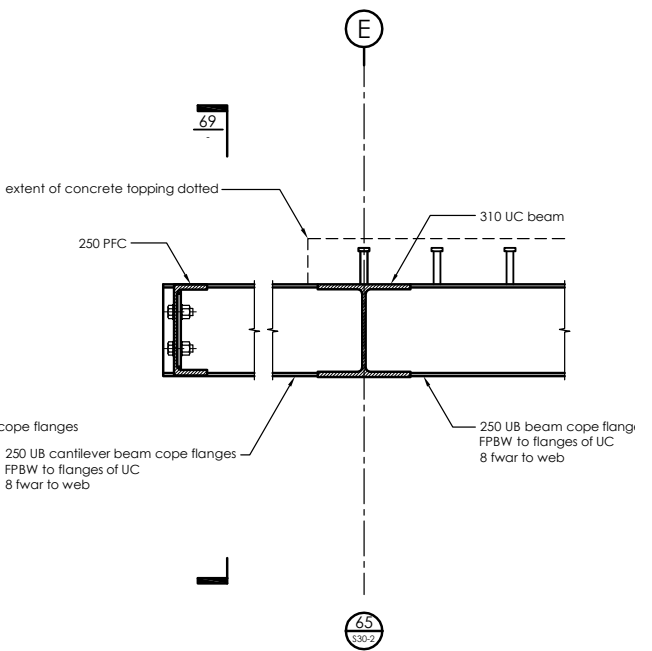
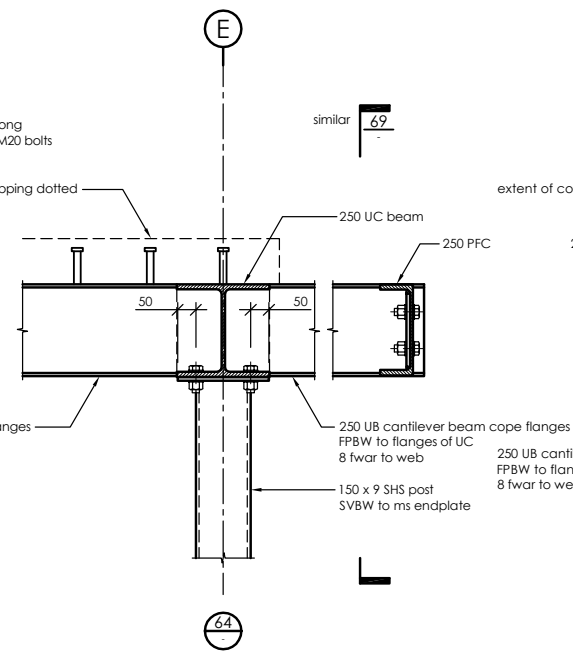
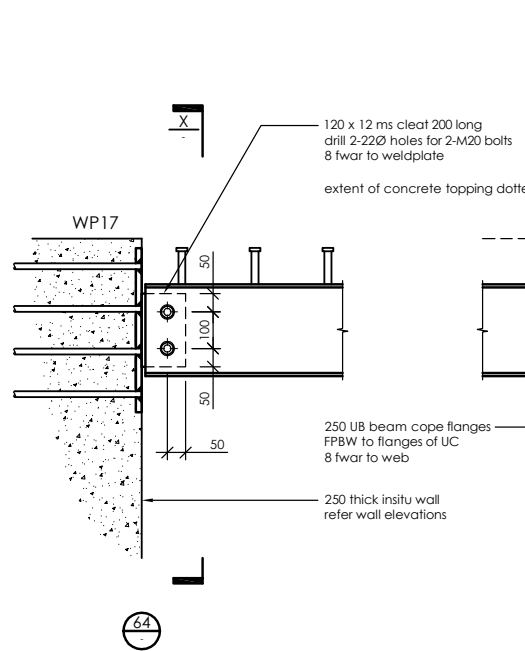
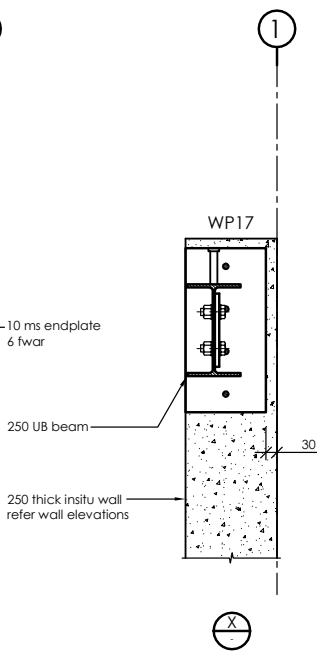
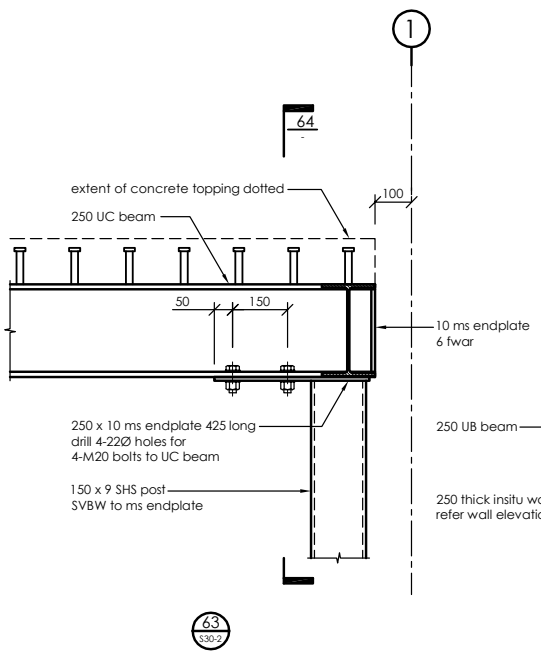
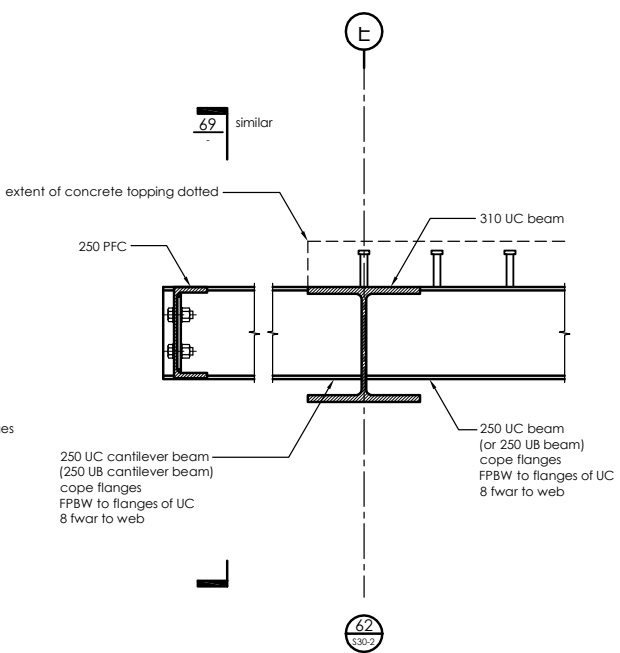
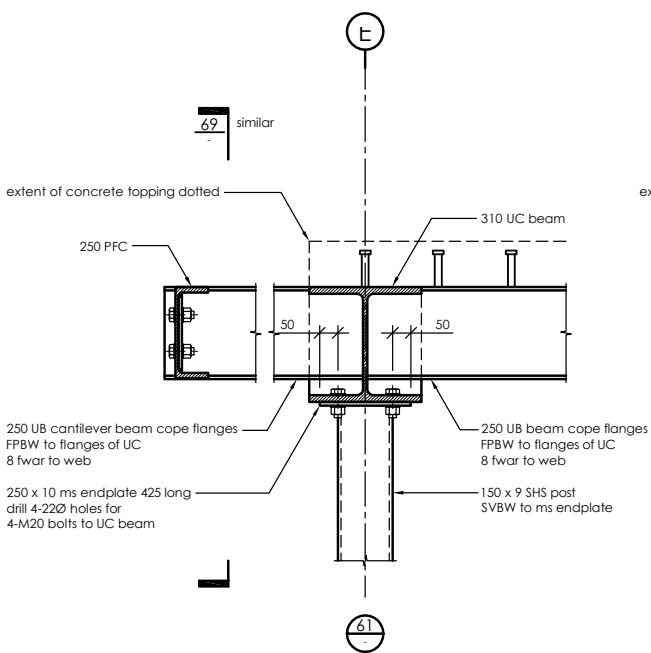
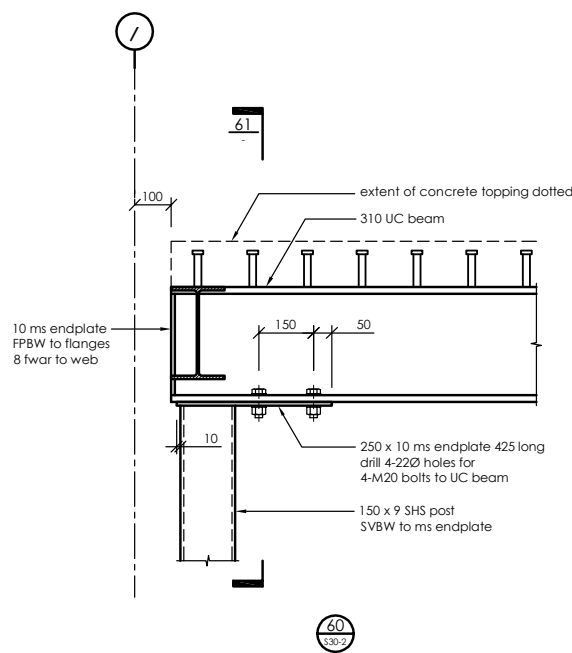
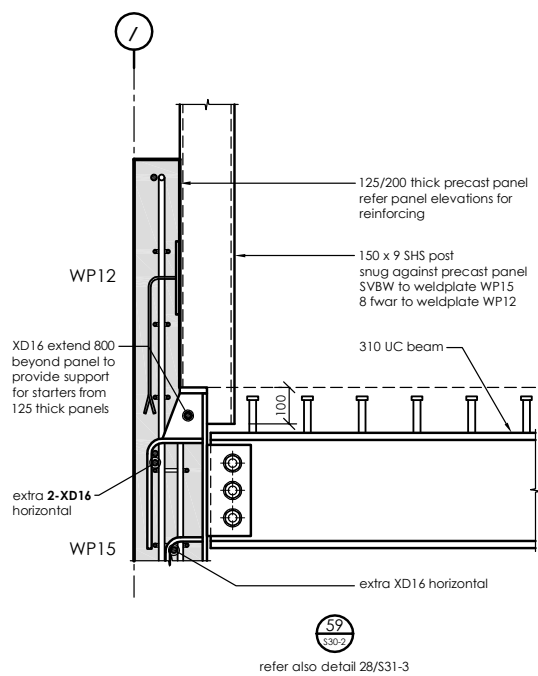
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STEELWORK/FRAME DETAILS  
SHEET 7 OF 8

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note: UB's to edge of slab  
(details 61 & 64/-) to have  
10 ms cleat stiffener to PF  
with 10 ms stiffener oppo:

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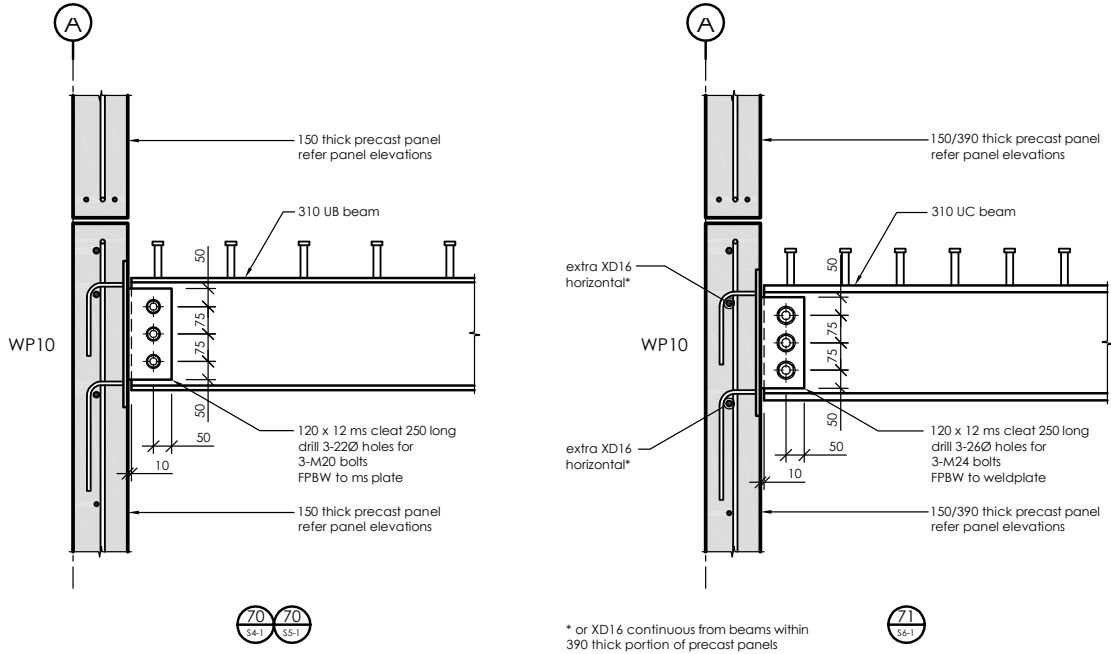
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STEELWORK /FRAME DETAILS  
SHEET 8 OF 8

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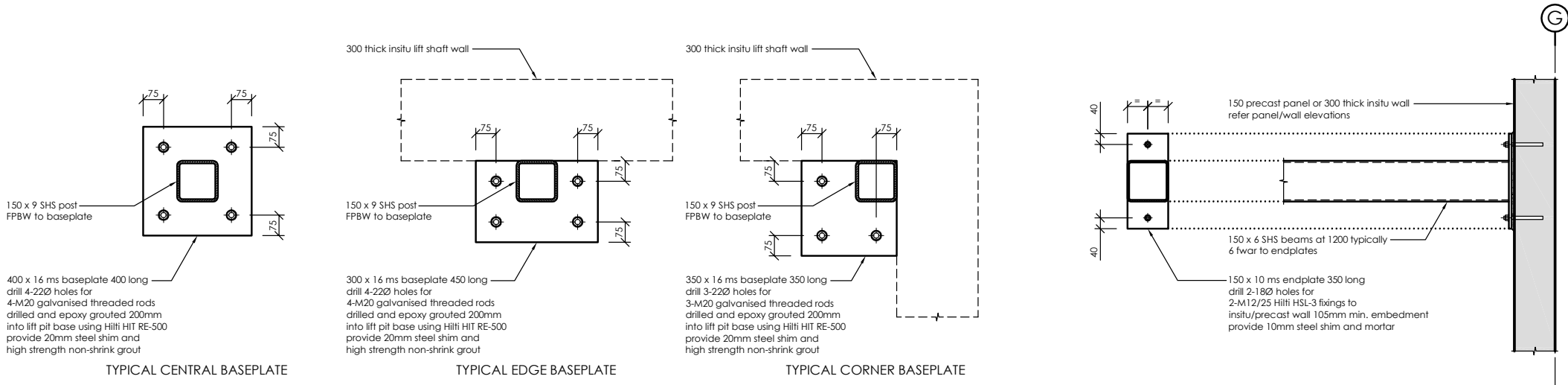
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DRAWING TITLE:

TYPICAL LIFT SHAFT  
STEELWORK DETAILS  
SHEET 1 OF 1

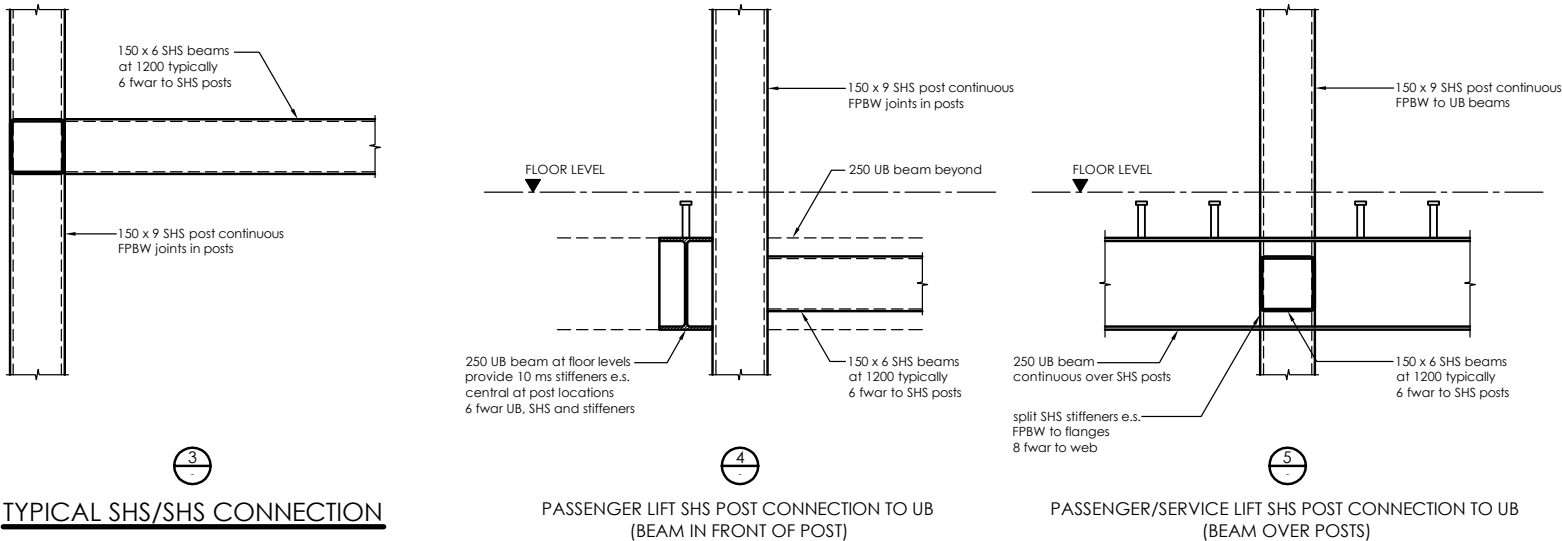
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FILE: 106019	DRAWING NO. S32-1	REV. A

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TYPICAL LIFT SHAFT COLUMN BASEPLATES

TYPICAL LIFT SHAFT BEAM CONNECTION



TYPICAL SHS/SHS CONNECTION

PASSENGER LIFT SHS POST CONNECTION TO UB  
(BEAM IN FRONT OF POST)

PASSENGER/SERVICE LIFT SHS POST CONNECTION TO UB  
(BEAM OVER POSTS)

REFER TO THE FOLLOWING FLOOR DETAILS  
FOR LIFT SHAFT STEELWORK CONNECTIONS  
TO FLOOR LEVEL AT THE SOUTHERN END  
OF THE LIFT SHAFT:  
34/S2-4, 30/S6-4 & 20/S8-3

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Refer Architects drawings for all set out dimensions, opening sizes, slab set downs, rebates, insitu nibs, upstands, sealants etc.

All discrepancies shall be referred to the Architect for resolution before proceeding with work.

Typically all insitu concrete wall elements to be 30 MPa concrete unless noted otherwise.

Typically all precast concrete and precast beams to be 35 MPa concrete unless noted otherwise.

All insitu interfaces and construction joints shall be thoroughly roughened to 5mm amplitude.

All precast to insitu interfaces and grouted joints shall be thoroughly roughened to 5mm amplitude.

All insitu walls to have XD starters  
All precast panels to have D starters  
All starters shall lap for full lap length beyond outermost drag bar where applicable

Floor topping bars running parallel to numerical gridlines shall have 30mm top cover (i.e. top bars - refer details)

Confirm all lift dimensions with lift manufacturers before commencing construction. Also confirm location of lift pit sumps.

All primary load bearing steelwork (including columns, beams, etc.) will require specific fire rating. Refer to Fire Engineer and/or Architect for requirements, details, and fire rating options.

Provide 200 nom. Nelson shear studs 100 long to all steel beams u.n.o.  
welded in accordance with AS 1554 Part 2.  
at 150 centres for all primary UC beams  
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Traydec units to typically have 70mm seating onto steel beams/angles/walls and 20mm side seating

All slab openings shall be trimmed with XD16 bars to all edges extend 600mm past opening u.n.o.

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GRIDLINE 6

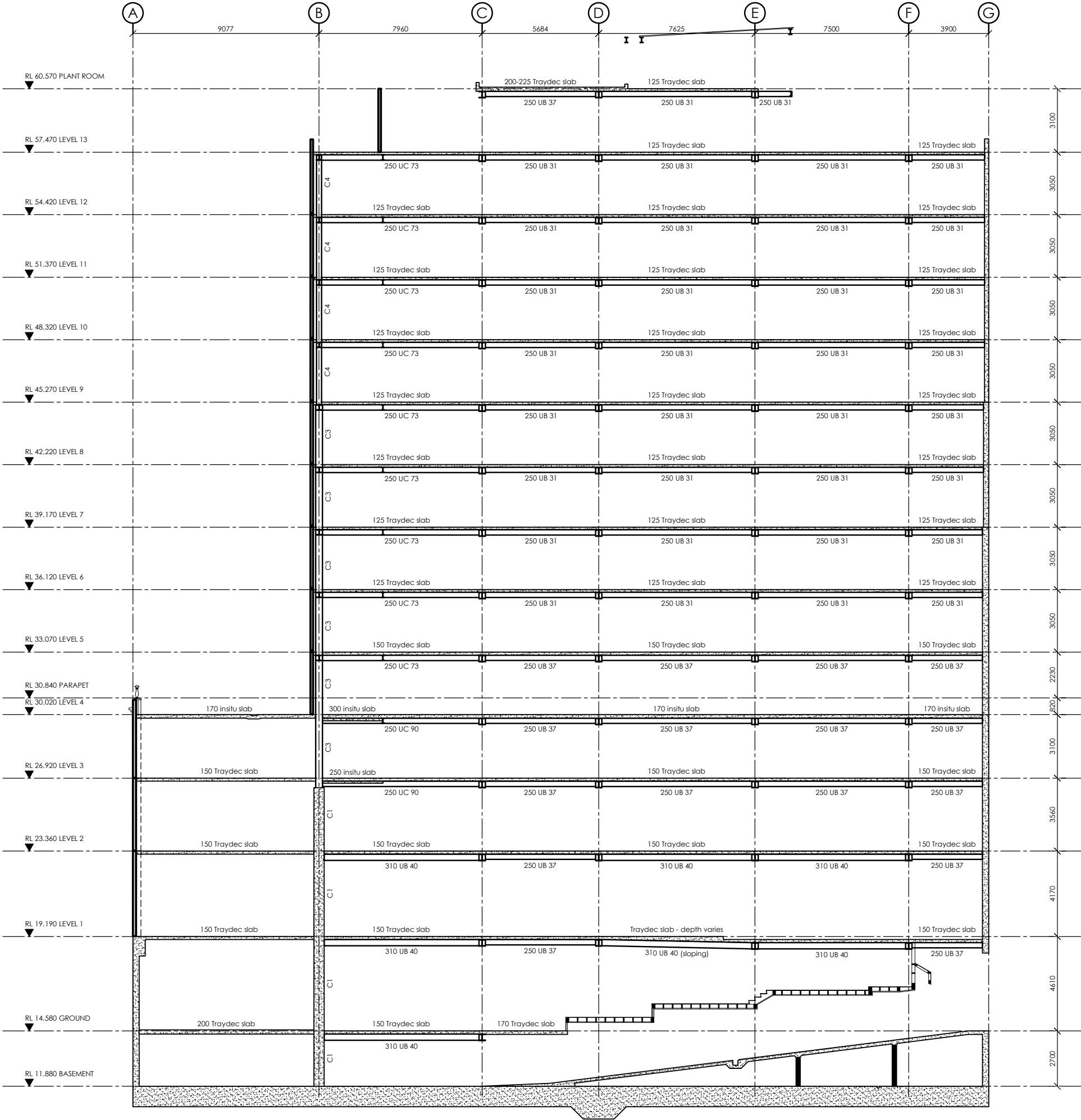
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COLUMN LEGEND

C1	500 x 500 concrete column (40MPa concrete)
C2	600 x 600 concrete column
C3	310 UC 158 steel column
C4	250 x 9 SHS steel column
C5	150 x 9 SHS steel column
C6	89 x 6 SHS steel column
C7	310 UC 198 steel column
C8	200 UC 52 steel column
C9	125 x 9 SHS steel column
C10	100 x 9 SHS steel column

LONG SECTION GRIDLINE 6  
1:100



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REFER TO ARCHITECT'S DRAWING FOR ALL SETOUTS

NOTES :

Refer notes sheet at the start of drawing set for notes typically

Refer Architects drawings for all set out dimensions, opening sizes, slab set downs, rebates, insitu nibs, upstands, sealants etc.

All discrepancies shall be referred to the Architect for resolution before proceeding with work.

Typically all insitu concrete wall elements to be 30 MPa concrete unless noted otherwise.

Typically all precast concrete and precast beams to be 35 MPa concrete unless noted otherwise.

All insitu interfaces and construction joints shall be thoroughly roughened to 5mm amplitude.

All precast to insitu interfaces and grouted joints shall be thoroughly roughened to 5mm amplitude.

All insitu walls to have XD starters  
All precast panels to have D starters  
All starters shall lap for full lap length beyond outermost drag bar where applicable

Floor topping bars running parallel to numerical gridlines shall have 30mm top cover (i.e. top bars - refer details)

Confirm all lift dimensions with lift manufacturers before commencing construction. Also confirm location of lift pit sumps.

All primary load bearing steelwork (including columns, beams, etc.) will require specific fire rating. Refer to Fire Engineer and/or Architect for requirements, details, and fire rating options.

Provide 200 nom. Nelson shear studs 100 long to all steel beams u.n.o.  
welded in accordance with AS 1554 Part 2.  
at 150 centres for all primary UC beams  
at 200 centres for all secondary UB beams

Traydec units to typically have 70mm seating onto steel beams/angles/walls and 20mm side seating

All slab openings shall be trimmed with XD16 bars to all edges extend 600mm past opening u.n.o.

A	22/01/08	CONSTRUCTION ISSUE	GPW
1	31/05/07	CONSENT ISSUE	GPW
REV.	DATE	AMENDMENT	BY

ARCHITECT:



lewis bradford  
CONSULTING ENGINEERS

PROJECT:

WARNERS NOVOTEL  
CHRISTCHURCH

DRAWING TITLE:

GENERIC LONG SECTION  
GRIDLINES 3, 4 & 5

DRAWN: GPW	SCALE:	
ENGINEER: AJW	1:100 @ A1	
CHECKED: CBL	1:200 @ A3	
FILE: 106019	DRAWING NO. S40-2	REV. A

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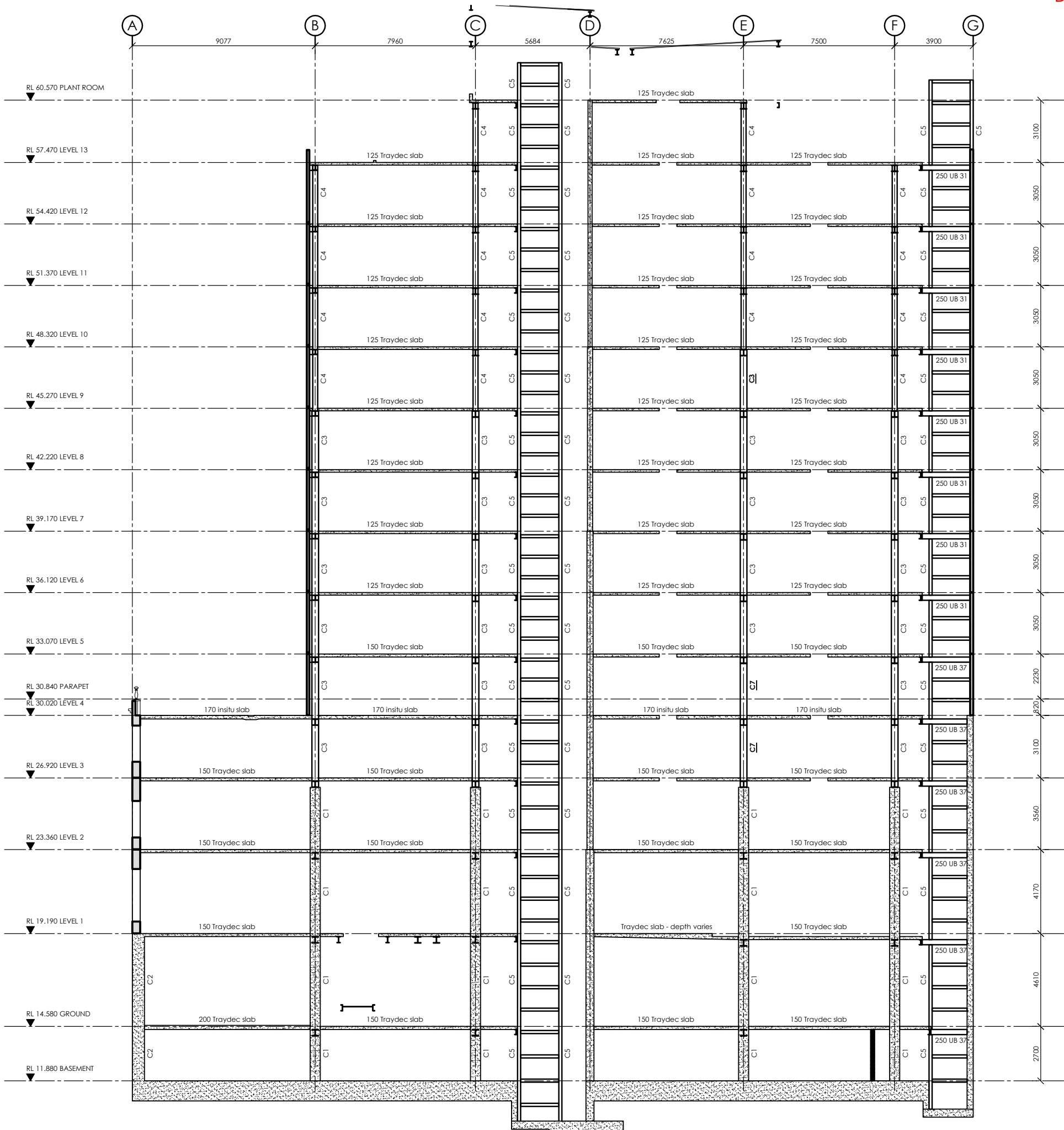
COLUMN LEGEND

- C1 500 x 500 concrete column (40MPa concrete)
- C2 600 x 600 concrete column
- C3 310 UC 158 steel column
- C4 250 x 9 SHS steel column
- C5 150 x 9 SHS steel column
- C6 89 x 6 SHS steel column
- C7 310 UC 198 steel column
- C8 200 UC 52 steel column
- C9 125 x 9 SHS steel column
- C10 100 x 9 SHS steel column

NOTE: THIS SECTION DOES NOT TECHNICALLY EXIST.  
IT IS A GENERIC SECTION THROUGH GRIDLINES 3, 4 & 5  
SHOWING ALL COLUMNS, LIFT PITS, WALLS ETC  
AS IF THEY ARE ALL CUT IN THIS SECTION.  
THIS DRAWING IS FOR INFORMATION/REFERENCE ONLY

GENERIC LONG SECTION

GRIDLINES 3, 4 & 5  
1:100





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CONTRACTOR TO VERIFY ALL DIMENSIONS ON SITE REFER TO ARCHITECT'S DRAWING FOR ALL SETOUTS

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Typically all precast concrete and precast beams to be 35 MPa concrete unless noted otherwise.

All insitu interfaces and construction joints shall be thoroughly roughened to 5mm amplitude.

All precast to insitu interfaces and grouted joints shall be thoroughly roughened to 5mm amplitude.

All insitu walls to have XD starters  
All precast panels to have D starters  
All starters shall lap for full lap length beyond outermost drag bar where applicable

Floor topping bars running parallel to numerical gridlines shall have 30mm top cover (i.e. top bars - refer details)

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welded in accordance with AS 1554 Part 2.  
at 150 centres for all primary UC beams  
at 200 centres for all secondary UB beams

Traydec units to typically have 70mm seating onto steel beams/angles/walls and 20mm side seating

All slab openings shall be trimmed with XD16 bars to all edges extend 600mm past opening u.n.o.

A	22/01/08	CONSTRUCTION ISSUE	GPW
1	31/05/07	CONSENT ISSUE	GPW
REV.	DATE	AMENDMENT	BY

ARCHITECT:



lewis bradford  
CONSULTING ENGINEERS

PROJECT:

WARNERS NOVOTEL  
CHRISTCHURCH

DRAWING TITLE:

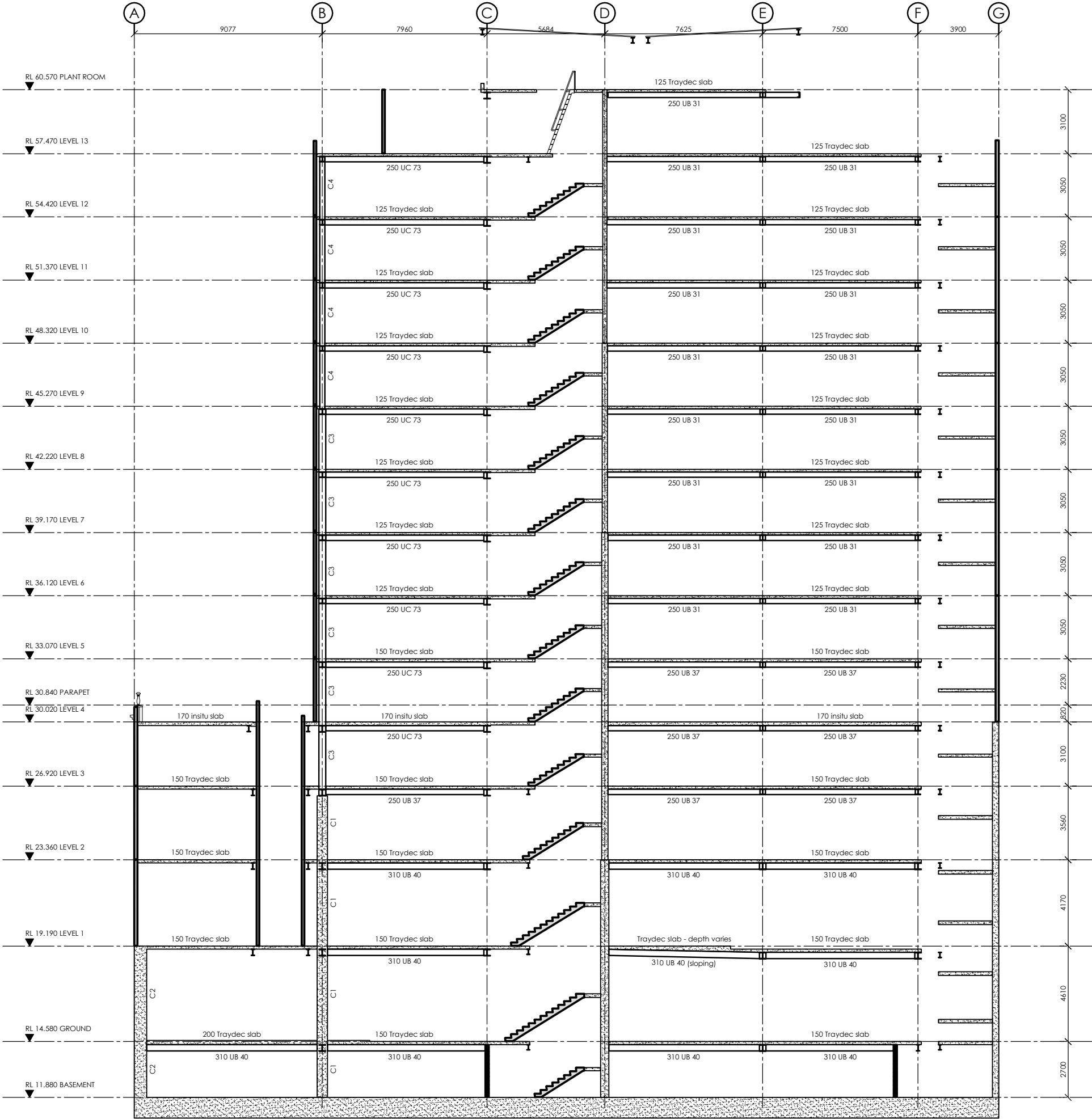
GENERAL LONG SECTION  
GRIDLINE 2

DRAWN: GPW	SCALE:	
ENGINEER: AJW	1:100 @ A1	
CHECKED: CBL	1:200 @ A3	
FILE: 106019	DRAWING NO. S40-3	REV. A

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COLUMN LEGEND

C1	500 x 500 concrete column (40MPa concrete)
C2	600 x 600 concrete column
C3	310 UC 158 steel column
C4	250 x 9 SHS steel column
C5	150 x 9 SHS steel column
C6	89 x 6 SHS steel column
C7	310 UC 198 steel column
C8	200 UC 52 steel column
C9	125 x 9 SHS steel column
C10	100 x 9 SHS steel column



3 LONG SECTION GRIDLINE 2  
1:100

CONTRACTOR TO VERIFY ALL DIMENSIONS ON SITE  
REFER TO ARCHITECT'S DRAWING FOR ALL SETOUTS

NOTES :

Refer notes sheet at the start of drawing set for notes typically

Refer Architects drawings for all set out dimensions, opening sizes, slab set downs, rebates, sealants etc.

Refer S21 series for typical details of 25mm thick precast panels

Refer S22 series for typical details of  
in situ walls and structural precast panels  
greater than 125mm thick

REINFORCING BAR LAPS		
Bar size	Lap length concrete	Lap length concrete block
D12	500 mm	500 mm
D16	650 mm	650 mm
D20	800 mm	800 mm
D25	1000 mm	1000 mm
D32	1300 mm	1300 mm
XD12	700 mm	850 mm
XD16	800 mm	1100 mm
XD20	1000 mm	1400 mm
XD25	1250 mm	1750 mm
XD32	1600 mm	2250 mm

Typically all insitu concrete wall elements to be 30 MPa concrete unless noted otherwise.

typically all precast concrete and precast beams to be 35 MPa concrete unless noted otherwise.

Unless shown otherwise all horizontal and vertical precast panel joints to be 15mm.

All insitu interfaces and construction joints shall be thoroughly roughened to 5mm amplitude.

All precast to insitu interfaces and grouted joints shall be thoroughly roughened to 5mm amplitude.

typically horizontal bars in double reinforced panels are to be outside vertical reinforcing  
5mm cover to outside bars typical

the lifting and transporting etc. of all panels is the responsibility of the Contractor, this includes the provision of strong backs as required (refer Specification).

The Contractor shall provide two copies of the shop drawings for precast concrete work to the Engineer for approval 14 days prior to manufacture.

A	22/01/08	CONSTRUCTION ISSUE	GPW
3	31/05/07	CONSENT ISSUE	GPW
	21/01/07	TENDER ISSUE	GPW
1	21/12/06	FOR CLIENT REVIEW	GPW
REV.	DATE	AMENDMENT	BY

ARCHITECT:



**lewis bradford**  
CONSULTING ENGINEERS

**PROJECT:**

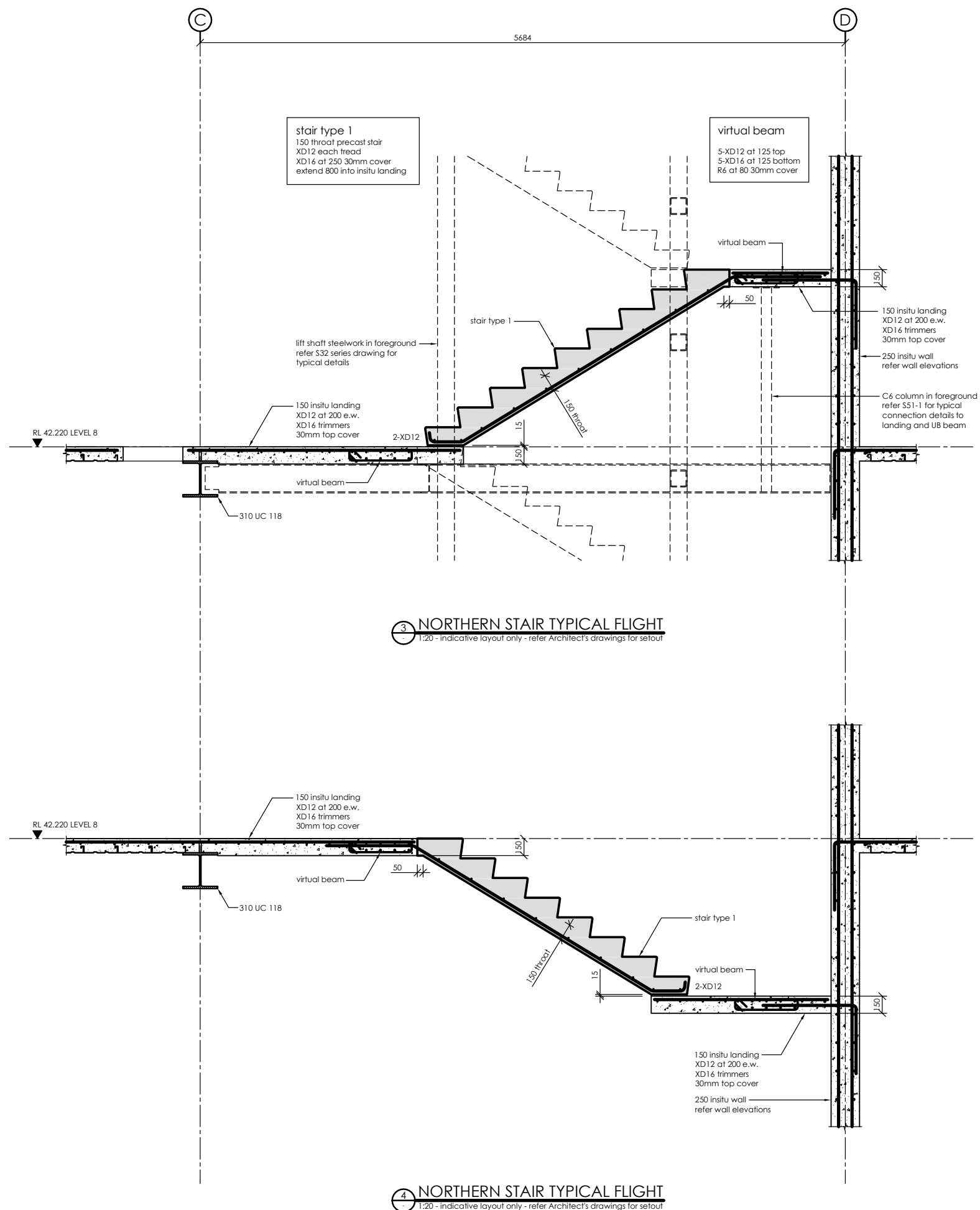
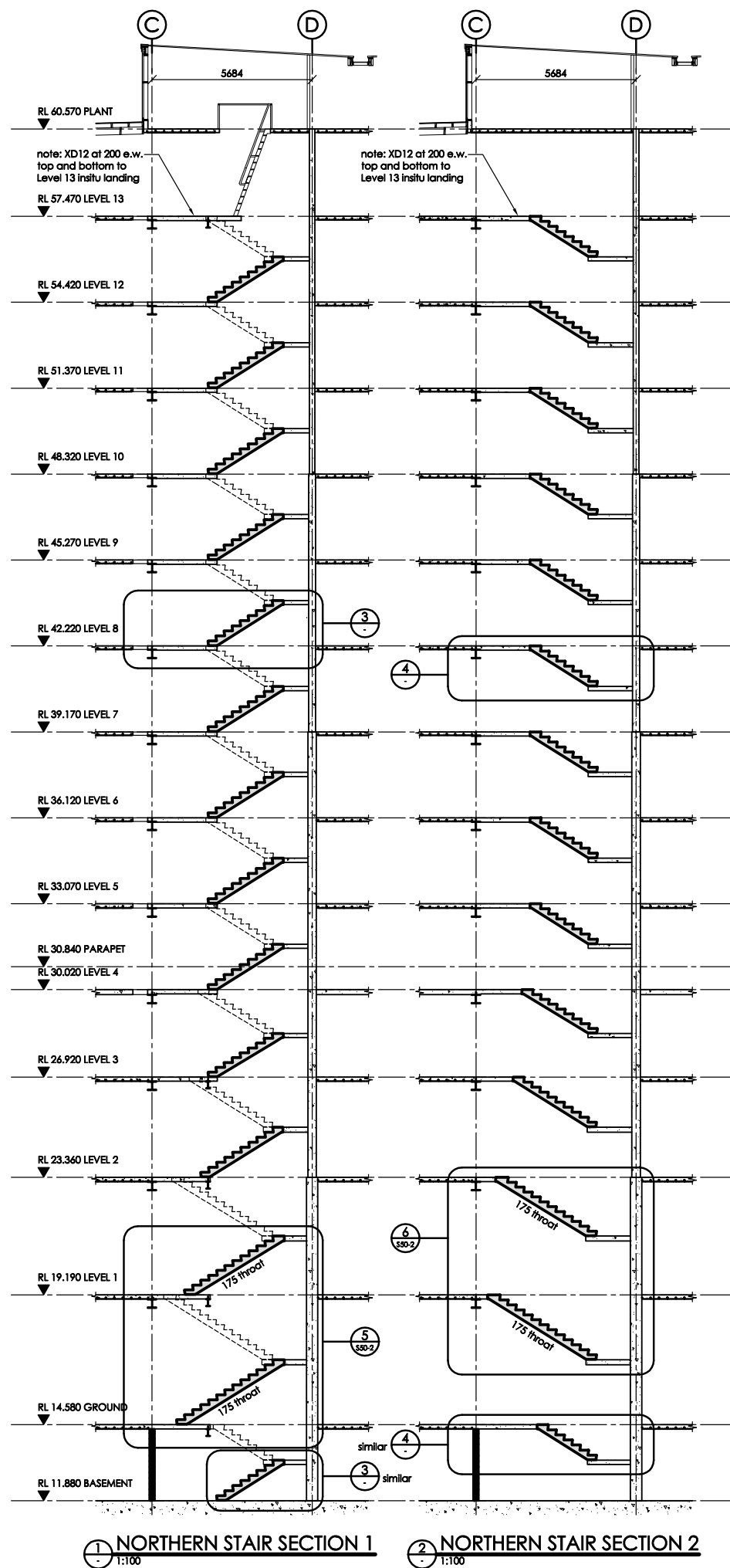
WARNERS NOVOTEL  
CHRISTCHURCH

DRAWING TITLE:

NORTHERN STAIR  
ELEVATIONS AND DETAILS  
SHEET 1 OF 2

DRAWN: GPW		SCALE: 1:100/20 @ A1 1:200/40 @ A3	
ENGINEER: AJW			
CHECKED: CBL			
FILE: 106019	DRAWING NO. S50-1	REV. A	

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4 NORTHERN STAIR TYPICAL FLIGHT  
1:20 - indicative layout only - refer Architect's drawings for setout

NOTES :

Refer S22 series for typical details of  
insitu walls and structural precast panels  
greater than 125mm thick

The Contractor shall provide two copies of the shop drawings for precast concrete work to the Engineer for approval 14 days prior to manufacture.

ARCHITECT:

PROJECT:

DRAWING TITLE:

DRAWN: <u>GBM</u>	S
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NOTES:

Refer notes sheet at the start of drawing set for notes typically

Refer Architects drawings for all set out dimensions, opening sizes, slab set downs, rebates, sealants etc.

Refer S21 series for typical details of 125mm thick precast panels

Refer S22 series for typical details of insitu walls and structural precast panels greater than 125mm thick

REINFORCING BAR LAPS		
Bar size	Lap length concrete	Lap length block
D12	500 mm	500 mm
D16	650 mm	650 mm
D20	800 mm	800 mm
D25	1000 mm	1000 mm
D32	1300 mm	1300 mm
XD12	700 mm	850 mm
XD16	800 mm	1100 mm
XD20	1000 mm	1400 mm
XD25	1250 mm	1750 mm
XD32	1600 mm	2250 mm

Typically all insitu concrete wall elements to be 30 MPa concrete unless noted otherwise.

Typically all precast concrete and precast beams to be 35 MPa concrete unless noted otherwise.

Unless shown otherwise all horizontal and vertical precast panel joints to be 15mm.

All insitu interfaces and construction joints shall be thoroughly roughened to 5mm amplitude.

All precast to insitu interfaces and grouted joints shall be thoroughly roughened to 5mm amplitude.

Typically horizontal bars in double reinforced panels are to be outside vertical reinforcing 35mm cover to outside bars typical

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The Contractor shall provide two copies of the shop drawings for precast concrete work to the Engineer for approval 14 days prior to manufacture.

REV.	DATE	AMENDMENT	BY
A	22/01/08	CONSTRUCTION ISSUE	GPW
4	31/05/07	CONSENT ISSUE	GPW
3	22/03/07	TENDER UPDATE ISSUE	GPW
2	31/01/07	TENDER ISSUE	GPW
1	21/12/06	FOR CLIENT REVIEW	GPW

ARCHITECT:



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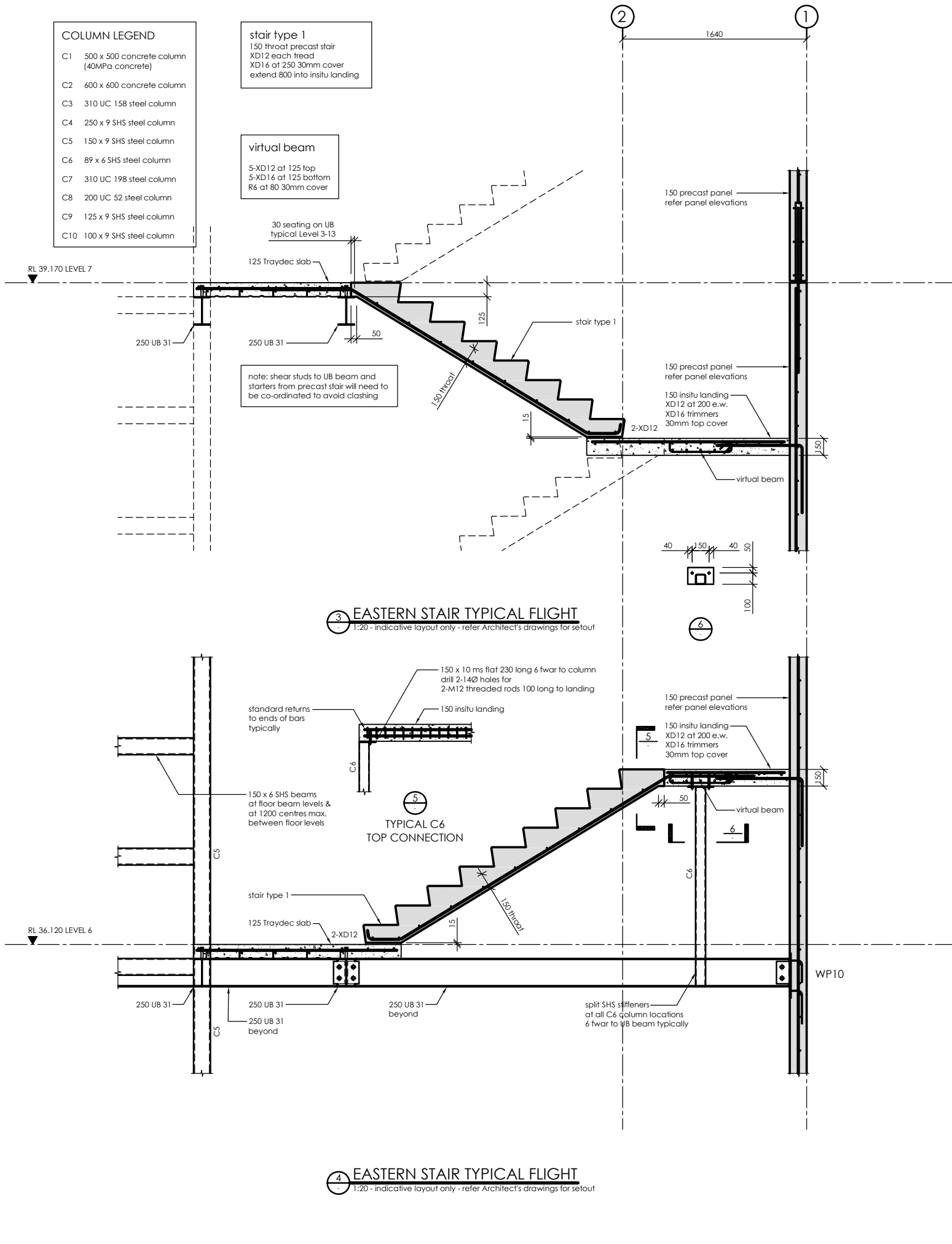
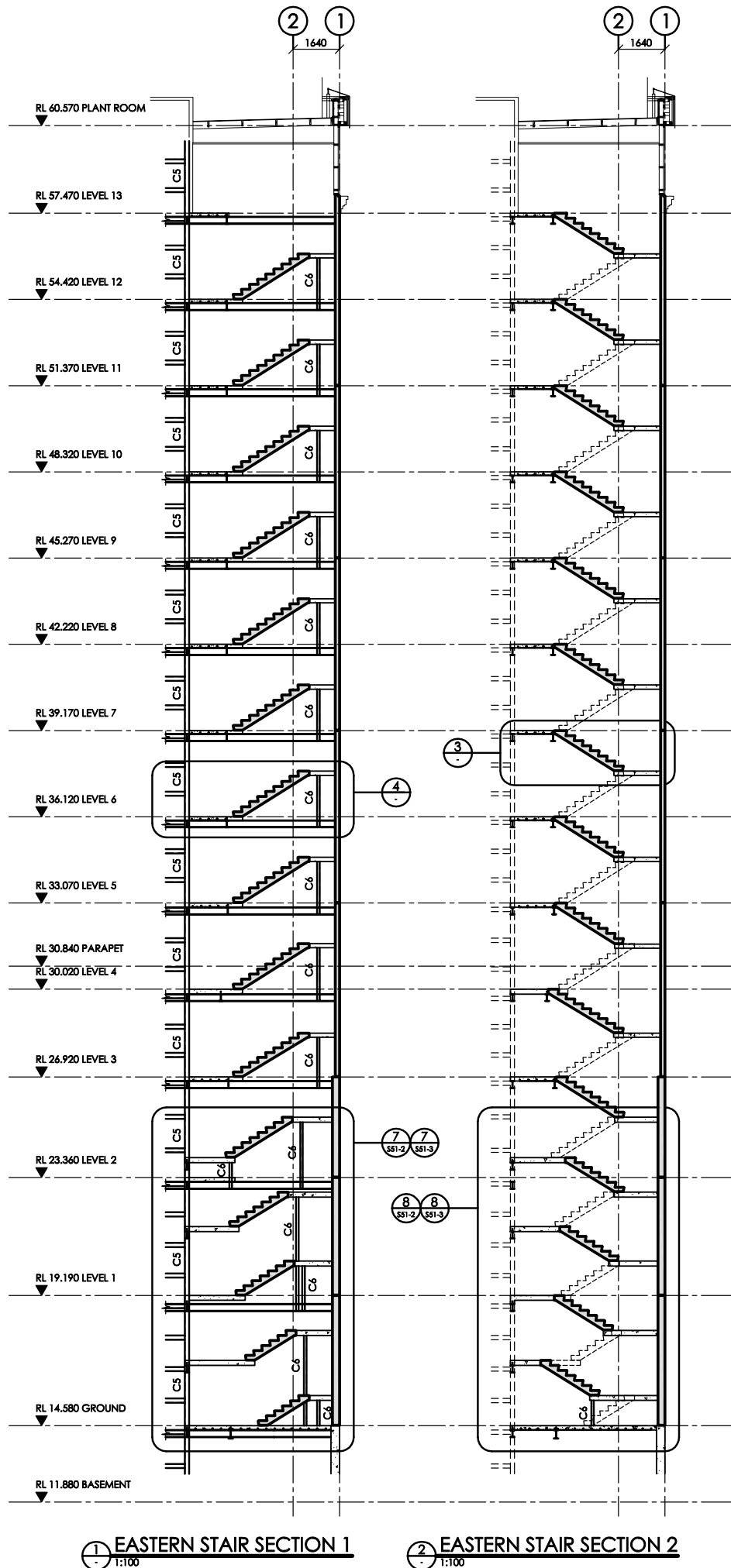
WARNERS NOVOTEL  
CHRISTCHURCH

DRAWING TITLE:

EASTERN STAIR  
ELEVATIONS AND DETAILS  
SHEET 1 OF 4

DRAWN: GPW	SCALE:	
ENGINEER: AJW	1:100/20 @ A1	
CHECKED: CBL	1:200/40 @ A3	
FILE: 106019	DRAWING NO. S51-1	REV. A

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Refer S21 series for typical details of 125mm thick precast panels

Refer S22 series for typical details of insitu walls and structural precast panels greater than 125mm thick

REINFORCING BAR LAPS		
Bar size	Lap length concrete	Lap length concrete block
D12	500 mm	500 mm
D16	650 mm	650 mm
D20	800 mm	800 mm
D25	1000 mm	1000 mm
D32	1300 mm	1300 mm
XD12	700 mm	850 mm
XD16	800 mm	1100 mm
XD20	1000 mm	1400 mm
XD25	1250 mm	1750 mm
XD32	1600 mm	2250 mm

Typically all insitu concrete wall elements to be 30 MPa concrete unless noted otherwise.

Typically all precast concrete and precast beams to be 35 MPa concrete unless noted otherwise.

Unless shown otherwise all horizontal and vertical precast panel joints to be 15mm.

All insitu interfaces and construction joints shall be thoroughly roughened to 5mm amplitude.

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REV.	DATE	AMENDMENT	BY
A	22/01/08	CONSTRUCTION ISSUE	GPW
3	31/05/07	CONSENT ISSUE	GPW
2	22/03/07	TENDER UPDATE ISSUE	GPW
1	31/01/07	TENDER ISSUE	GPW

ARCHITECT:



lewis bradford  
CONSULTING ENGINEERS

PROJECT:

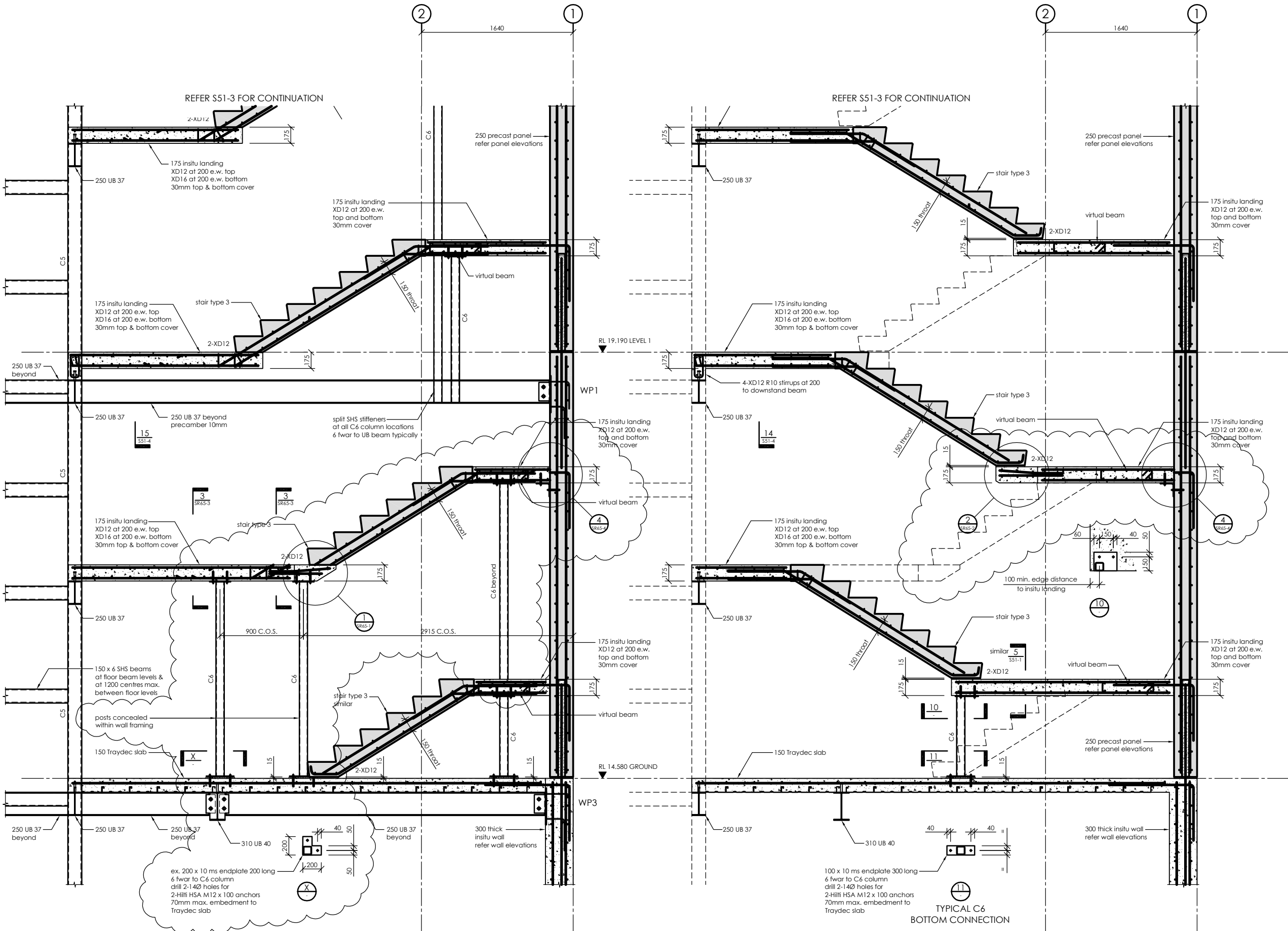
WARNERS NOVOTEL  
CHRISTCHURCH

DRAWING TITLE:

EASTERN STAIR  
ELEVATIONS AND DETAILS  
SHEET 2 OF 4

DRAWN: GPW	SCALE: 1:20 @ A1	REV.
ENGINEER: AJW	1:40 @ A3	
CHECKED: CBL		
FILE: 106019	DRAWING NO. S51-2	A

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virtual beam  
5-XD12 at 125 top  
5-XD16 at 125 bottom  
R10° at 100° 30mm cover  
\*175 insitu landings only

8 EASTERN STAIR LOWER FLIGHTS  
S51-2 1:20

REVISED STAIR SECTION

Sketch SR65-0  
106019 18/09/08 AJW

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Refer S21 series for typical details of 125mm thick precast panels

Refer S22 series for typical details of insitu walls and structural precast panels greater than 125mm thick

REINFORCING BAR LAPS		
Bar size	Lap length concrete	Lap length concrete block
D12	500 mm	500 mm
D16	650 mm	650 mm
D20	800 mm	800 mm
D25	1000 mm	1000 mm
D32	1300 mm	1300 mm
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XD20	1000 mm	1400 mm
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XD32	1600 mm	2250 mm

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REV.	DATE	AMENDMENT	BY
A	22/01/08	CONSTRUCTION ISSUE	GPW
3	31/05/07	CONSENT ISSUE	GPW
2	22/03/07	TENDER UPDATE ISSUE	GPW
1	31/01/07	TENDER ISSUE	GPW

ARCHITECT:



lewis bradford  
CONSULTING ENGINEERS

PROJECT:

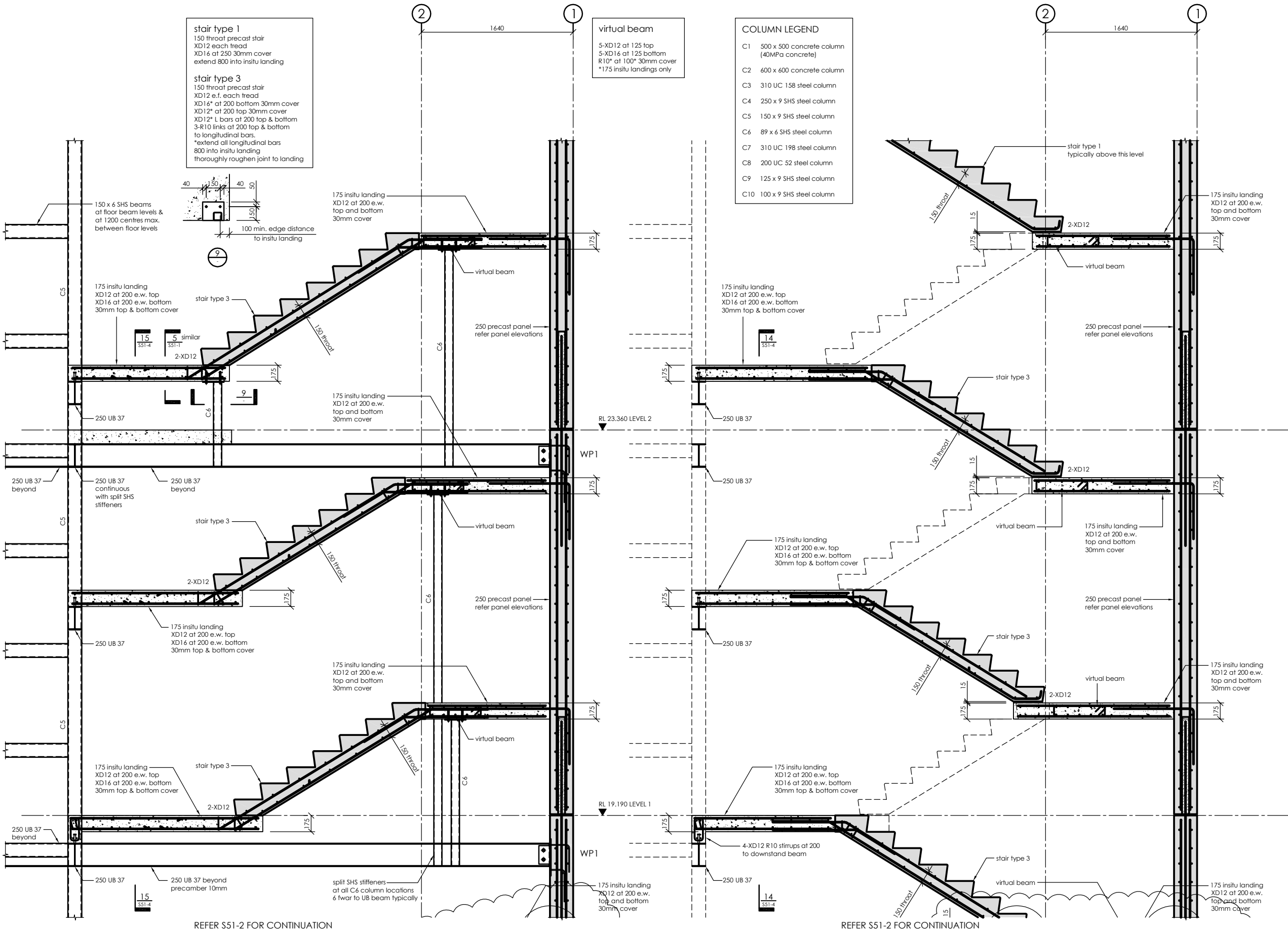
WARNERS NOVOTEL  
CHRISTCHURCH

DRAWING TITLE:

EASTERN STAIR  
ELEVATIONS AND DETAILS  
SHEET 3 OF 4

DRAWN: GPW	SCALE:	
ENGINEER: AJW	1:20 @ A1	
CHECKED: CBL	1:40 @ A3	
FILE: 106019	DRAWING NO. S51-3	REV. A

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REFER S51-2 FOR CONTINUATION

REFER S51-2 FOR CONTINUATION

7 EASTERN STAIR LOWER FLIGHTS  
S51-1 1:20

8 EASTERN STAIR LOWER FLIGHTS  
S51-1 1:20



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REINFORCING BAR LAPS		
Bar size	Lap length concrete	Lap length concrete block
D12	500 mm	500 mm
D16	650 mm	650 mm
D20	800 mm	800 mm
D25	1000 mm	1000 mm
D32	1300 mm	1300 mm
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XD20	1000 mm	1400 mm
XD25	1250 mm	1750 mm
XD32	1600 mm	2250 mm

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A	22/01/08	CONSTRUCTION ISSUE	GPW
REV.	DATE	AMENDMENT	BY

ARCHITECT:



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CONSULTING ENGINEERS

PROJECT:

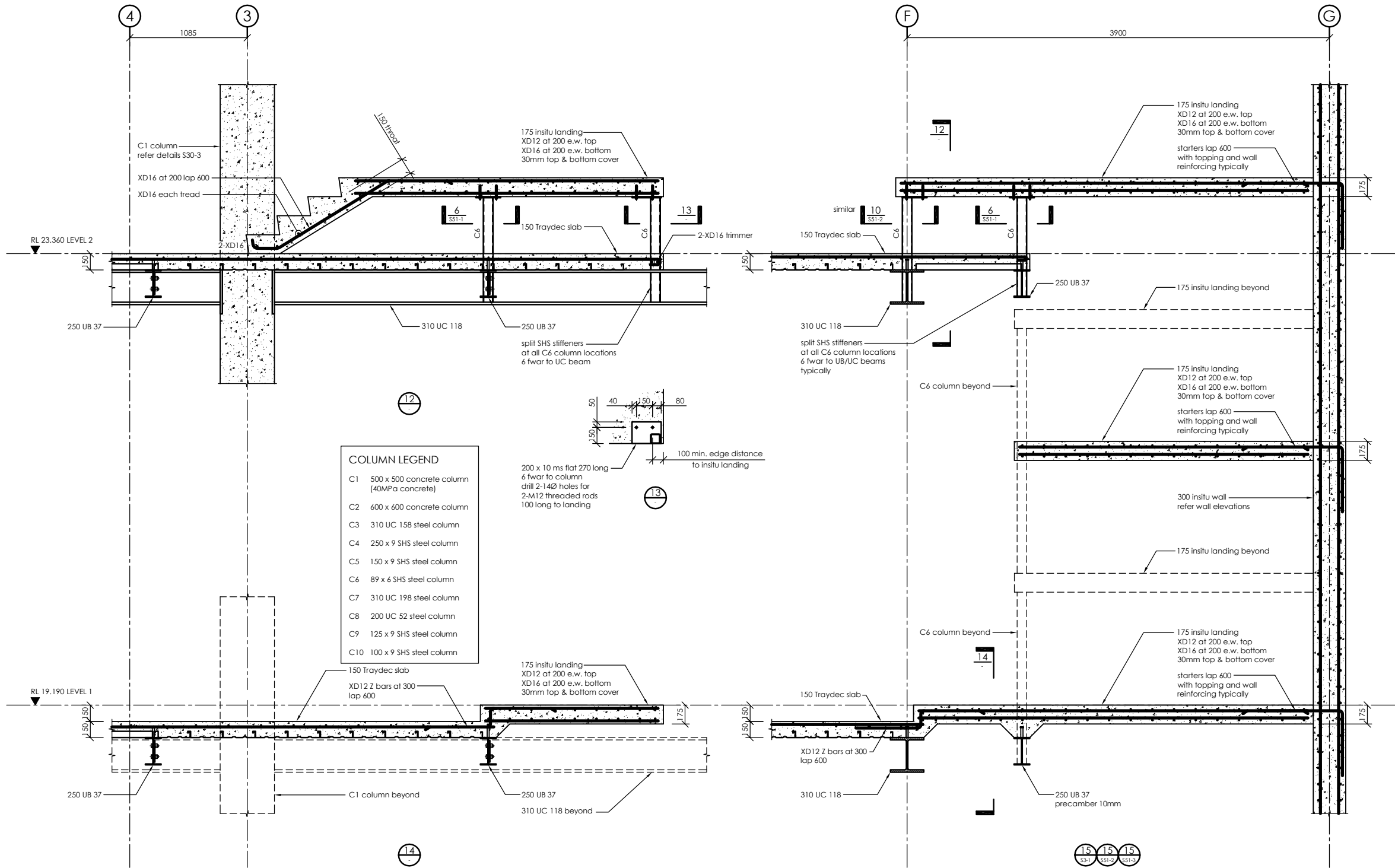
WARNERS NOVOTEL  
CHRISTCHURCH

DRAWING TITLE:

EASTERN STAIR  
ELEVATIONS AND DETAILS  
SHEET 4 OF 4

DRAWN: GPW	SCALE:	
ENGINEER: AJW	1:20 @ A1	
CHECKED: CBL	1:40 @ A3	
FILE: 106019	DRAWING NO. S51-4	REV. A

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REINFORCING BAR LAPS		
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D12	500 mm	500 mm
D16	650 mm	650 mm
D20	800 mm	800 mm
D25	1000 mm	1000 mm
D32	1300 mm	1300 mm
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REV.	DATE	AMENDMENT	BY
2	31/05/07	CONSENT ISSUE	GPW
1	31/01/07	TENDER ISSUE	GPW

ARCHITECT:



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CONSULTING ENGINEERS

PROJECT:

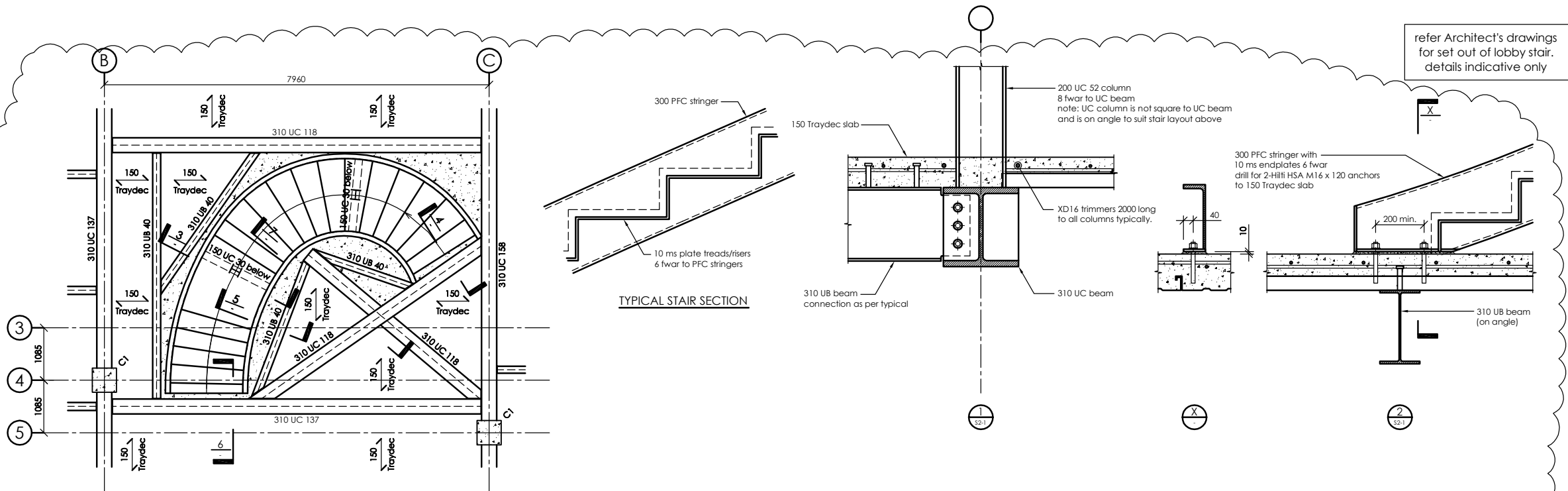
WARNERS NOVOTEL  
CHRISTCHURCH

DRAWING TITLE:

LOBBY STAIR  
ELEVATIONS AND DETAILS  
SHEET 1 OF 1

DRAWN: GPW	SCALE:	
ENGINEER: AJW	1:50/10 @ A1	
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FILE: 106019	DRAWING NO. S52-1	REV. 2

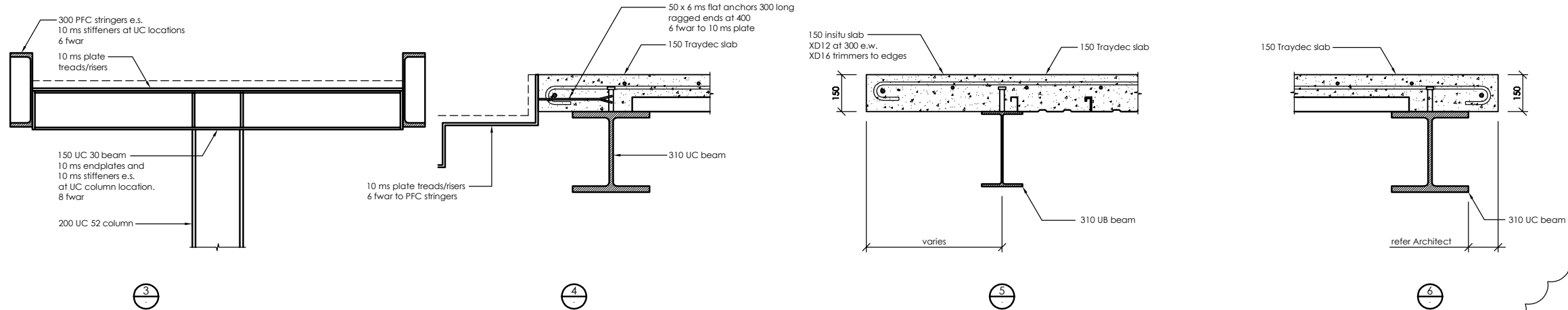
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LOBBY STAIR PART PLAN

1:50

refer S31 series drawings for typical steelwork connections u.n.o.



ON HOLD

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NOTES :

Refer notes sheet at the start of drawing set for notes typically

All structural steel shall be mild steel conforming to NZS 3404:1997.

Refer Architect's drawings for details of drilled hole requirements to suit timber plate fixings to steel work members unless detailed otherwise.

Surface preparation and corrosion protection of steel work shall be in accordance with the Specification.

All exposed ends of RHS members to be capped with ex. 10mm ms plate unless shown otherwise.

All plates shall be 10mm minimum unless noted otherwise.

Unless shown otherwise, all welds are to be 6 fillet weld all round refer to the Specification for type and class of weld.

Mild steel flat anchors to weldplates to have minimum bend radius of 2.5 x thickness of flat and bent around a former pin.

All bolts and nuts shall be grade 8.8 high strength.

All holding down bolts and other fixing devices, shall have a minimum yield stress of 240 MPa unless noted otherwise.

Provide 200 nom. Nelson shear studs 100 long to all steel beams welded in accordance with AS 1554 Part 2.  
at 150 centres for all primary UC beams  
at 200 centres for all secondary UB beams

All exterior steel work to be hot dip galvanised in accordance with AS 1650, unless noted otherwise.

All load bearing steel work (including columns, beams, etc.) will require specific fire rating. Refer to Fire Engineer and/or Architect for requirements, details, and fire rating options.

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A	22/01/08	CONSTRUCTION ISSUE	GPW
3	31/05/07	CONSENT ISSUE	GPW
2	31/01/07	TENDER ISSUE	GPW
1	21/12/06	FOR CLIENT REVIEW	GPW
REV.	DATE	AMENDMENT	BY

ARCHITECT:



lewis bradford  
CONSULTING ENGINEERS

PROJECT:

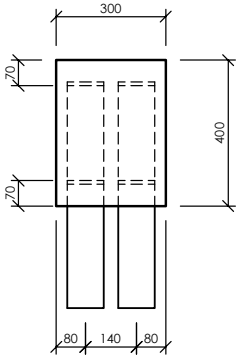
WARNERS NOVOTEL  
CHRISTCHURCH

DRAWING TITLE:

WELDPLATE DETAILS  
SHEET 1 OF 2

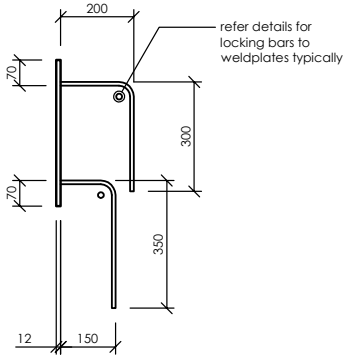
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FILE: 106019	DRAWING NO. S60-1	REV. A

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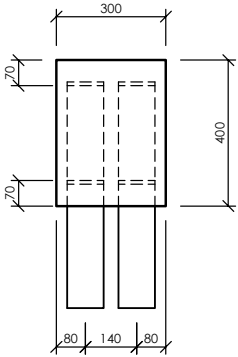
weldplate WP1

300 x 12 ms flat 400 long  
4-100 x 10 ms flat anchors  
500 long 8 fwar to ms flat



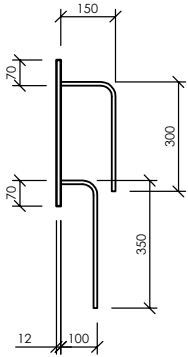
weldplate WP1a

300 x 12 ms flat 400 long  
4-100 x 16 ms flat anchors  
500 long FPBW to ms flat



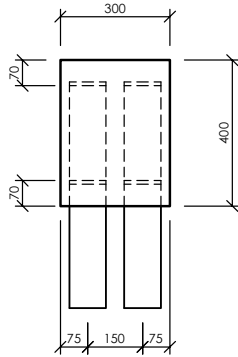
weldplate WP2

300 x 12 ms flat 400 long  
4-100 x 10 ms flat anchors  
450 long 8 fwar to ms flat



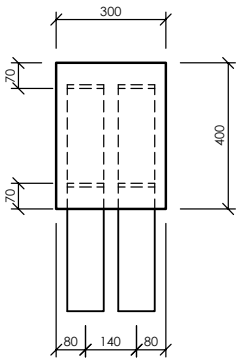
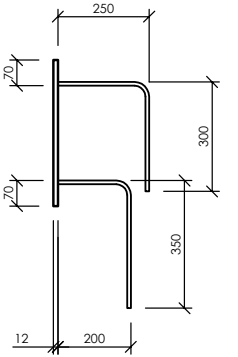
weldplate WP3

300 x 12 ms flat 400 long  
4-100 x 10 ms flat anchors  
550 long 8 fwar to ms flat



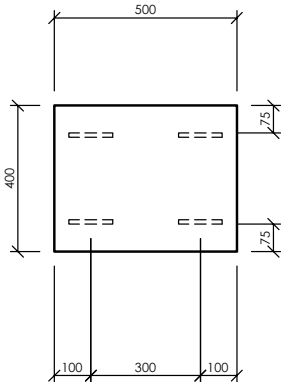
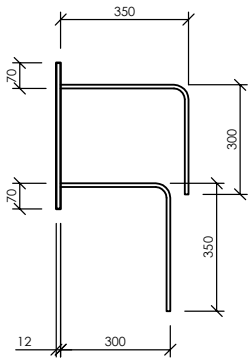
weldplate WP3a

300 x 12 ms flat 400 long  
4-100 x 16 ms flat anchors  
550 long FPBW to ms flat



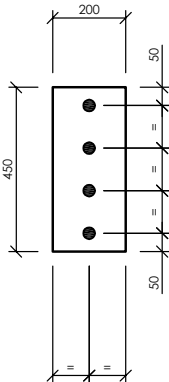
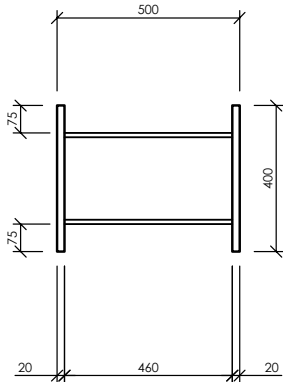
weldplate WP4

300 x 12 ms flat 400 long  
4-100 x 10 ms flat anchors  
650 long 8 fwar to ms flat



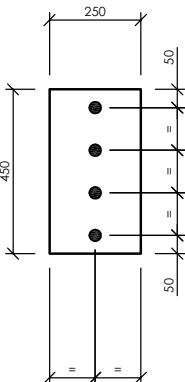
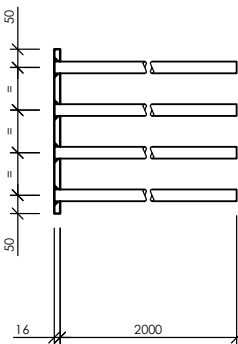
weldplate WP5

2-400 x 20 ms flats 500 long  
4-120 x 12 ms flat anchors  
460 long FPBW to ms flats  
5mm expansion gap to all edges  
of weldplate typical



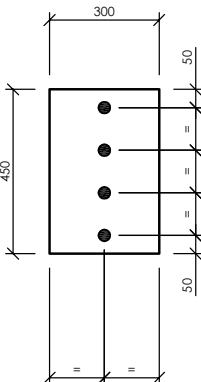
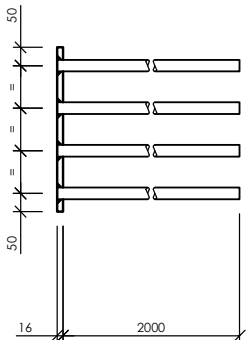
weldplate WP6

200 x 16 ms flat 450 long  
4-D32 2000 long  
plug welded to ms flat



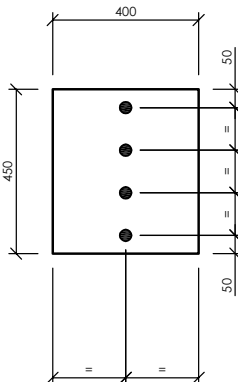
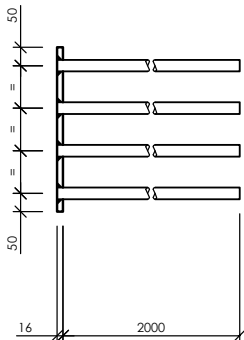
weldplate WP7

250 x 16 ms flat 450 long  
4-D32 2000 long  
plug welded to ms flat



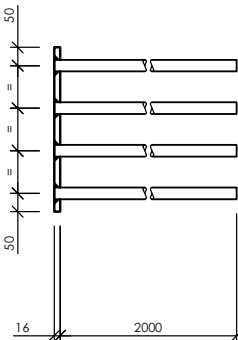
weldplate WP8

300 x 16 ms flat 450 long  
4-D32 2000 long  
plug welded to ms flat



weldplate WP9

400 x 16 ms flat 450 long  
4-D32 2000 long  
plug welded to ms flat





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CONTRACTOR TO VERIFY ALL DIMENSIONS ON SITE  
REFER TO ARCHITECT'S DRAWING FOR ALL SETOUTS

NOTES :

Refer notes sheet at the start of drawing set for notes typically

All structural steel shall be mild steel conforming to NZS 3404:1997.

Refer Architect's drawings for details of drilled hole requirements to suit timber plate fixings to steel work members unless detailed otherwise.

Surface preparation and corrosion protection of steel work shall be in accordance with the Specification.

All exposed ends of RHS members to be capped with ex. 10mm ms plate unless shown otherwise.

All plates shall be 10mm minimum unless noted otherwise.

Unless shown otherwise, all welds are to be 6 fillet weld all round refer to the Specification for type and class of weld.

Mild steel flat anchors to weldplates to have minimum bend radius of 2.5 x thickness of flat and bent around a former pin.

All bolts and nuts shall be grade 8.8 high strength.

All holding down bolts and other fixing devices, shall have a minimum yield stress of 240 MPa unless noted otherwise.

Provide 200 nom. Nelson shear studs 100 long to all steel beams welded in accordance with AS 1554 Part 2.  
at 150 centres for all primary UC beams  
at 200 centres for all secondary UB beams

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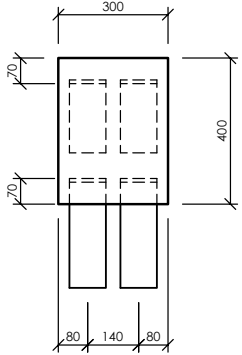
WARNERS NOVOTEL  
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DRAWING TITLE:

WELDPLATE DETAILS  
SHEET 2 OF 2

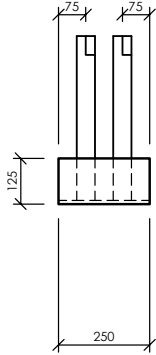
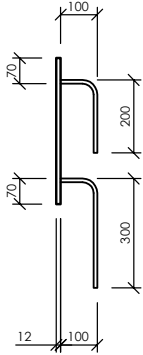
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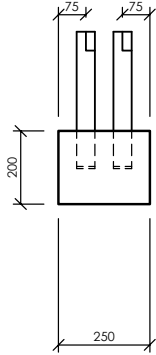
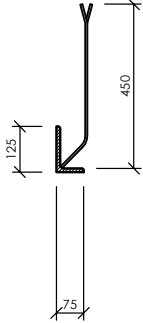
weldplate WP10

300 x 12 ms flat 400 long  
4-100 x 10 ms flat anchors  
300 or 400 long 8 fwar to ms flat



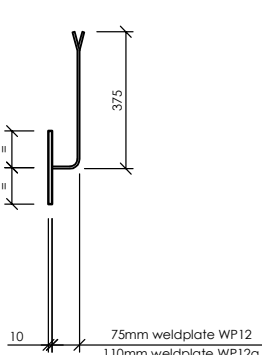
weldplate WP11

125 x 75 x 10 UA 250 long  
2-50 x 6 ms flat anchors  
450 long ragged ends  
6 fwar to ms angle  
note: exterior weldplates to be  
hot dip galvanised



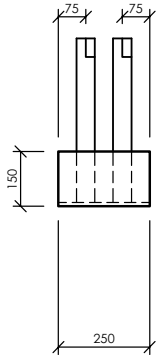
weldplate WP12

200 x 10 ms flat 250 long  
2-50 x 6 ms flat anchors  
450 long ragged ends  
6 fwar to ms flat  
note: exterior weldplates to be  
hot dip galvanised



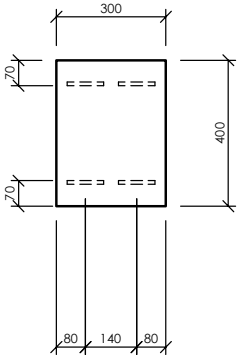
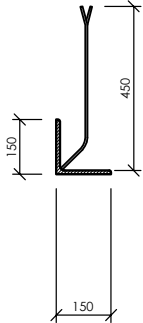
weldplate WP12a

200 x 10 ms flat 250 long  
2-50 x 6 ms flat anchors  
485 long ragged ends  
6 fwar to ms flat  
note: exterior weldplates to be  
hot dip galvanised



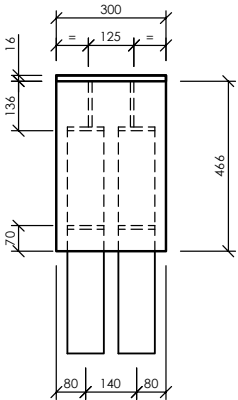
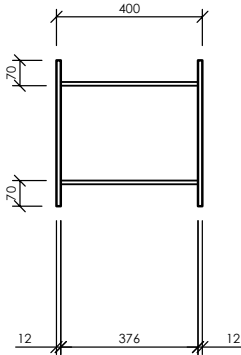
weldplate WP13

150 x 10 EA 250 long  
2-50 x 6 ms flat anchors  
450 long ragged ends  
6 fwar to ms angle



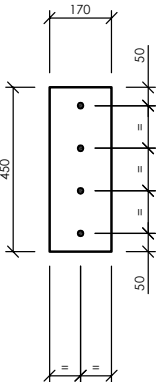
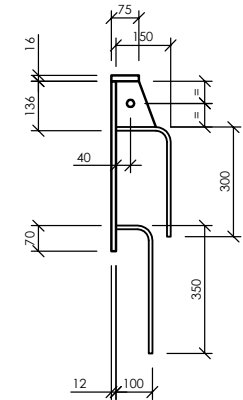
weldplate WP14

2-300 x 12 ms flats 400 long  
4-100 x 10 ms flat anchors  
376 long 8 fwar to ms flats



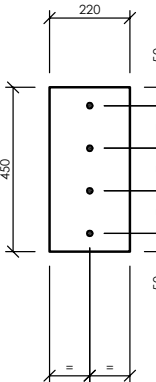
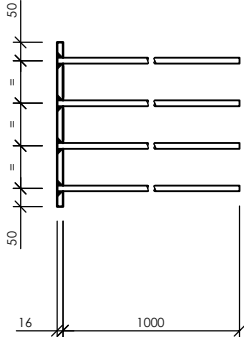
weldplate WP15

300 x 12 ms flat 466 long  
75 x 16 ms flat 300 long  
FPBW together  
4-100 x 16 ms flat anchors  
450 long FPBW to ms flat  
2-12 ms stiffeners gussets as shown  
drill 200 holes to 2 ms stiffeners  
as shown for XD16 trimmers  
FPBW to ms flats and anchors.  
5mm expansion gap to sides  
of weldplate



weldplate WP16

170 x 16 ms flat 450 long  
4-D16 1000 long  
plug welded to ms flat



weldplate WP17

220 x 16 ms flat 450 long  
4-D16 1000 long  
plug welded to ms flat

