



APARTMENTS & HIGH RISE

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APARTMENTS & HIGH RISE

APARTMENTS & HIGH RISE

NEW

This section captures the specific variances in high rise. Good practice can also be found in earlier sections e.g. first fix, plasterboard, second fix and has not been included in this section to avoid duplication.

- Apartments and high rise require a different approach to our housing sites. For the purposes of this Manual, complex multistorey projects are defined as those projects that the business unit carries out that involve apartment schemes, often with elements of associated retail and commercial space, constructed on constrained sites and that are of bespoke nature, designed with the assistance of an external, consultant design team, generally multi-storey and generally involving a structural frame – usually concrete.
- 2 The project team must be familiar with it and understand the principle of working in a fully integrated team.
- 3 The framework contains a set of Rules and Best Practice, but it is recognised that operating in the spirit is more important that following the letter of them.
- 4 The teams and contractors must have a clear understanding of the building regulations in relation to fire. In particular, where cladding is concerned, only competent and approved contractors can install the cladding system.



Complex Multi-Storey Projects Framework VERSION 3.5 | 15T MARCH 2018



USEFUL LINKS

ONLINE

Complex Multi-Storey Projects Framework https://taylorwimpey.sharepoint.com/ teams/ComplexProjects

OFFLINE

This can be accessed via the Working Together tab on the intranet and clicking Complex Projects.

HEALTH AND SAFETY



- 1 Temporary works full temporary works procedures, including all appointments, i.e. plus permit system for loading and striking.
- 2 Work at height for Reinforced Concrete (RC) erection team, temporary edge protection, inertia reels, etc. plus edge / fall protection provided for follow on contractors.
- **3** Falling objects and materials
- 4 Public protection fans, tunnels, etc. vehicles accessing / egressing site.
- 5 Site security hoarding, security presence, tower crane security, etc.
- 6 Use of concrete pumps.
- 7 Tower cranes (see Page 206).
- 8 Material handling lifted by crane, then by pallet trucks and manual handling, etc. plus waste handling and removal from building, etc.
- 9 Access and task lighting.
- **10** Fire arrangements alarms, maintaining a means of escape.
- **11** Fire tender access must be maintained.
- **12** Noise and vibration.
- **13** Traffic and access management.

- **14** On completion of the RC Frame, the contractor must leave suitable proprietary edge protection in place and the use of designed lift shaft guards is recommended.
- **15** Multiple sign-in points for each block must be provided so there is a clear understanding of who is working in each area.
- **16** All service holes through the slab should have fixed covers or other suitable protection, i.e. handrails.
- **17** The use of preparatory permanent staircase shutters, such as Stair Master, speeds construction and provides inserts for temporary handrailing from day one.
- **18** A design stage assessment can be made as the possible advantages of permanent stair shutters over pre-cast components.
- **19** Working at heights on roofs, balconies or podium slab in exposed locations may need additions to the mandatory PPE requirements. No suitable edge or fall protection must remain in place until the work is complete.
- **20** These requirements should be covered at subcontractor Pre-Start meetings to avoid any doubt.
- **21** Roof access is often restricted to AOV openings. Permits to work need to take account of restricted access, exposure to wind and loading of materials.

COMPLEX SCAFFOLD DESIGN PER APARTMENT BLOCK

APARTMENTS & HIGH RISE

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1 A complex scaffold design is required for each apartment building and the following must be considered. Multiple boarded lifts may be required whether as access or working platforms. The scaffold must include arrangements for tieing into the structure, i.e. types and positions, tie removal strategy / external building treatments that will have interaction with scaffold ties i.e. cladding and possible tie removal strategy or scaffold dismantlement strategy.

However, the external envelope design may lend its self to consideration of the use of mast climbers rather than scaffold. Early specialist involvement can provide greater flexibility and savings. The Structural Engineer will need to be involved to sign off the design, particularly where podium slabs are used to foot the climbers. If considering hoists, please liaise with both the Regional Health, Safety and Environmental Advisor (RHSEA), Structural Engineer, Scaffold Designer to ensure that the part constructed property can take the physical loads of the hoist.

Early engagement with Sales will ensure the advertising scheme gets designed into the temporary works package.

MAST CLIMBERS







1 The use of mast climbers, where feasible, can free up key elevations early to provide access for services or can assist sales with a scaffold-free street view.

Mast climbers are generally more cost effective when the hire time is less than 35 weeks.

They can be erected / dismantled in days giving rapid access to the entire elevation and the cost for adaptations / maintenance of scaffolding lifts are removed. Mast climbers only needed to be inspected monthly whereas scaffolding must be inspected weekly.

Mast climbers require minimal ties to the building and these should be in place as per the design.

CRANES, SECURITY, RHSEA & ENGINEER SIGN OFF

TOWER CRANE AND CRAWLER CRANE MANUAL



1 The TW Tower Crane Manual must be followed and will assist the site team from concept to removal along with specialist input from RHSEA.

Tower crane extraction must be planned at the same time as tower crane erection.

A tracking document must be used for each tower crane required.



CRANES, SECURITY, RHSEA AND ENGINEER SIGN OFF

1 Tower crane design will need Structural Engineers and Specialist HSE Advisor sign off prior to foundation start.

All necessary licences and agreements need to be considered during concept stage.

Early involvement with the key stake holders is critical.

Tower crane layouts showing lifting zones and loadings must be displayed and used as part of site inductions.

NETWORK RAIL AGREEMENTS





1 All licences and agreements with adjacent landowners need to be in place and displayed on the site notice board.

Agreement dates and compliance should be reviewed regularly at project meetings.

HIGH RISE SERVICES

1 Although initially generators may be used, construction and fit out of sub-station, if required, is key to provide early power for tower cranes and mast climbers.

It also enables energisation of completed floors while access equipment is still in place externally.

The service file issued at Pre-Start should cover existing and proposed, with where appropriate information about adjacent rail and underground lines, with contact information.



STAIRWELLS AND LIFTS

APARTMENTS & HIGH RISE



1 Reinforced concrete staircases should be designed to BS EN 1992-1-1 and comply with NHBC standards Chapter 2.1 'Concrete and its reinforcement' and, where appropriate, designed by an Engineer in accordance with Technical Requirement R5. Stair pitch of 38° for common or access stairs.



2 A safe access and egress system should be used.





Core assembly to have a consistent smooth finish.





Construction holes must be filled using a suitable concrete hole filling compound and neatly dressed.

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1 For the RC erection team and for working at height, temporary edge protection, inertia reels plus edge / fall protection provided for follow on contractors. On completion of the RC frames, the contractor must leave the proprietary edge protection in place and use of designed lift shaft guards is recommended.



2 Preparatory permanent staircase shutters such as Stair Master speeds construction and provides inserts for temporary handrailing from start of construction. A design stage assessment can be made as to the possible advantages of permanent stair shutters over pre-cast stairs. All service holes through the slab should have fixed corners or other suitable protection i.e. handrails.



3 Additional PPE may be needed on high rise sites. Working at heights on roofs, balconies or podium slab in exposed locations may need additions to the mandatory PPE requirements. No suitable edge or fall protection must remain in place until the work is complete.



4 Additional and specific signage may be required on high rise sites.

APARTMENTS & HIGH RISE

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1 Proprietary fire barriers used for vertical and horizontal fire protection within the cladding system. They should only be secured with mechanical fixings. Bespoke QA check lists of key items such as fire barriers will need to be employed and incorporated into the sub-contractor's management systems to ensure compliance.

Note:

Materials that make up the external walls for building over 11m in height must be of limited or non-combustibility. Only those materials specified in the design can be used. Substitution of materials is prohibited unless approved by the principle designer.



2 It is a good practice for the SiteM to maintain a catalogue of all work being carried out and implementing daily QA checks. This ensures the integrity of the handover for sign off from the contractor's inspections and records of work.

DTM team should form part of the inspection once a month and form part of the sign-off.



3 Fire barriers should be tightly packed with special care taken for difficult areas such as around corners and brackets.

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1 A designed fire alert system will be required to be linked to smoke detection systems in all zones.



2 Fire points are required to all cores and landings. A service agreement should be in place to ensure managed maintenance and testing of the site temporary equipment.



3 The fire plan may identify a requirement for temporary fire doors to be installed in large common areas or to provide zoned protection during build.





The purpose of a fire door is to create a barrier between a communal area and the location of a fire. It is designed to create a firm seal when closed. As such, it is essential that fire doors are not propped open, as this would render them useless in the event of a fire. Fire doors in communal areas should be self-closing and have keep shut signage.



APARTMENTS & HIGH RISE

1 FIGURE 52

NEW

Approved Document B, Volume 1 has been extended to include new paragraphs 15.13-15.16. These paragraphs provide guidance on signs to assist the fire service to identify each floor and flat in the following locations:

On the landing of every protected stairway.

In every protected lobby or corridor into which a firefighting lift opens.

Again, this applies where the height of the top floor of the block of flats to the lowest ground level outside the building is 11m or more. The guidance also confirms details of the minimum letter heights, wording, style, and the positioning/legibility of the signs.





2 Communal areas to be kept clear of obstructions. Ensure all signage, lighting and smoke alarms are in place.



3 Em qua

Emergency lights should be installed by a qualified electrician and can usually be either ceiling or wall mounted.

The lights are connected to the buildings mains power circuits which keeps the backup battery charged. In the event of a power failure the emergency light will continue to operate under the power of the back-up battery.

Emergency lights are usually installed with a test switch (fish key switch) on their circuit which allows them to be tested by interrupting the mains power supply to the lights only.

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APARTMENTS & HIGH RISE

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FIRE RISK / ESCAPE

SAFETY CRITICAL



1 Dry risers should be installed at an early stage to provide protection during build. The site Traffic Management Plan (TMP) should locate all fire points and dry risers in line with the site Fire Risk Assessment (FRA). The scheme should be registered with the local fire brigade.



2 NEW All pipework/ducting to be neat and laid to line and level. Supports to be provided a maximum 600mm centres. Pipework to be insulated where required.





3 Fire stopping installed to guidelines.

Fire stopping installed by a certified company will come with test compliance stickers and is highly visible at warranty inspection.

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APARTMENTS & HIGH RISE



Ductwork passing through protected areas should have non-combustible fixings and supports.

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2 Ductwork should be installed in a neat and workmanlike manner, be securely fixed and have adequate support throughout its length, sealed mechanically with fixed joints and connections.



3 Where ductwork passes through an external wall, it should be positioned to slope slightly outwards to prevent water entering the building.



4

Clips and supports for ductwork should be spaced at equal distances and in accordance with manufacturers' instructions, TW details and design.

STEEL ROOF STRUCTURES



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NEW

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Steel framed roofs require particular focus and attention to detail. Torque tests are to be provided for each fixing. Ensure steel members are not defective. The layout of the structure should be monitored to ensure the design is followed.



2 No visible corrosion should be present to beams, fixings or welds.



3 New

Fixings should be individually checked. It is important to have a robust QA system in place.

TRAFFIC MANAGEMENT PLAN



1 NOTICES AND LICENCES

Hoarding licences, footpath closures and parking suspensions need to be planned and applied for concept stage. Off-loading areas may be required on public roads. Off site holding areas should be investigated to minimise disruption in adjacent roads, where vehicles can be parked up and called forward as cranage becomes available or back on line after being winded off. Fleet operators should be FORS accredited.



2 ENHANCED TRAFFIC MANAGEMENT Enhanced traffic management on tight sites may necessitate a stop / go system and physical barriers to off load areas – external off-loading areas. Timed deliveries

or an advanced call in system can be set up and suppliers Pre-Start meets to avoid congestion in built up areas. Trained traffic marshals are required if there has been an identified risk otherwise, they are not compulsory.

Advanced use of forklifts must be risk assessed and discussed with RHSEA.



3 NOTICES AND LICENCES

Managed access systems to site are recommended to aid security. Inducted operatives and visitors access via finger print recognition system. The system must default open with a link to the fire alarm in case of emergency.



4 ENHANCED TRAFFIC MANAGEMENT

Proprietary access systems can be linked to software in the office. The system records all personnel on site and key members such as fire marshals and first aiders. It will also provide a fire role call list if required.

ACCOMMODATION & STORAGE



1 SITE MANAGEMENT WELFARE PLAN

The SiteM should produce a welfare plan at project execution stage to enable commercial to add into subcontractor packages. Planning at an early stage will result in competitive pricing during subcontractor procurement. It may be necessary to obtain engineering advise if there is a need to leave out internal walls. Welfare design will be bespoke.



2 Basements or retail space can provide bespoke office and welfare facilities if required. Storage on tight sites can by maximised by using any commercial or retail space.



3 BESPOKE WELFARE

Must be fit for purpose for all personnel on site. Suitably qualified Structural Engineers sign-off for compliance is required. An assessment of ventilation requirements should be made to check if a forced extract system is required.



4 Inner city developments with restricted parking will invariably lead to the workforce using public transport. Enhanced facilities such as canteens, showers and storage lockers will help prevent a high turnover of trades.

INSPECTIONS & QUALITY ASSURANCE

Bespoke BQCs will need to be in place.

Many design subcontractors have their own QA lists that can be added to the TW file. Prior to handover of the RC Frame an as built survey should be provided by the contractor. BU should ensure a Fire Consultant is in place to ensure both design and installation is compliant with regulations.



1 CUBE TESTING ON RC FRAMES

RC Frame contractors must carry out and provide concrete test results for all pours. Arrangement should be in place for the testing facility to copy results direct to TW Technical department to have independent visibility of both 7 and 28-day results. For RC frame seek engineer to design bay pours and construction joints. SMT to gain understanding on design principles of RC frame, design cover and trik track NHBC requirements, design reinforcement bar laps, anti-cracking provisions to floor penetrations, understanding that the frequency of reinforcement to floors will increase where there is a load transferring column below, also often the bar diameter will increase to this connection point, details for floor uplift from columns, tanking details / waterproof concrete such as NHBC's two combined waterproofing systems.



2 CLADDING QUALITY

Every penetrations Ethylene Propylene Diene Monomer (EDPM) should be tested and recorded. Curtain wall testing should be carried out by a specialist contractor to an agreed design and specification with records kept. Lift design requirements can affect the structure, as such the package needs to be placed early. Key elements pre-installation includes the water tightness of the lift pit, building in of a designed testing beam to the supplier's requirements and design of any over-run head room.

Note:

Only approved cladding systems can be installed in accordance with TW Technical Bulletins and the specification and details. In addition, only suitably qualified installers can install cladding system and checks must be made on site that they have the requisite approvals in place.

BEST PRACTICE





- 1 Detailed schematics of the mechanical and electrical risers will enable enough design space to house all necessary components and be presentable and accessible for maintenance. Subcontractor involvement early, can influence the design and buildability issues can be ironed out, often leading to cost savings.
- 2 Early mechanical and electrical coordination should establish responsibilities for the support system to avoid double work. An example is; Plumber provides the support and the Electrical Contractor fixes it.





3 Cable trays will need to be inverted where story heights reduce ceiling void space to a minimum. BS 7671: 2019 (IET Wiring Regulations 19th Edition) states, wiring systems shall be supported such that they will not be liable to premature collapse in the event of fire.

NEW INVERTED CABLE TRAYS

Cables that are providing power to fire alarms should be separate from other circuits and supported by non-combustible fixings. Steel mixings at maximum 1m centres are recommended. In addition, all cables should be supported by non-combustible fixings within 500mm of the penetration of any fire resisting structure.

BEST PRACTICE





1 Plant room design, installation and commissioning programmes should be in place to run alongside mains service dates to ensure smooth completion.



2 During the build process the site team should build up a library of information to help populate the Home User Guide (HUG). The Operations and Maintenance Manual provided for the HA and / or Management Company should also include a record of design changes.

EXTERNALS



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APARTMENTS & HIGH RISE



Downpipes should be recessed into the building where possible.

Downpipes should be fixed in accordance with the design, using the correct type of fittings for internal and external angles, outlets etc to ensure efficient drainage of the roof.



2 NEW

Balconies must be designed to direct water away form the building. Adequate drainage outlets must be provided.

Balconies must be installed as per TW drawings, design and manufacturers' instructions.





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External areas around blocks are to be kept clean and tidy. Hard and soft landscaping is to be installed as late into the build as possible.