

3.0 FOUNDATIONS

The site is to be properly assessed and investigated. Foundations and structure details (inc retaining walls) shall be suitable for the ground conditions and where necessary the site shall be remediated and precautions taken in accordance with Environment Agency and Local Authority requirements, appropriate documentation and validation to be provided on request. Foundations shall be designed by a suitably qualified person. All cavity wall brickwork below DPC level is to be filled with weak mix concrete up to 150mm below the lowest DPC.

Please refer to Civil Engineer's drawings for proposed external ground levels. Please refer to Civil Engineer's and Utilities Consultants drawings for full details of all drainage and incoming service penetrations. Please refer to Structural Engineer's information for full details of all subsurface utilities, substructure masonry specification & foundations. Generally, all facing brickwork is to continue 225mm below proposed ground level, unless otherwise advised by the Structural Engineer and/or approved brick manufacturer. All masonry proposed for use below ground level is to be confirmed as suitable for this application by the manufacturer's product specific technical literature. Foundations are to suit recommendations of the site(geo-environmental reports). Waterproof tanking, where required, is to be installed in accordance with the detailed construction drawings/specialist manufacturer's designs and specifications.

4.0 DRAINAGE BELOW GROUND

All below ground drainage is to be in accordance with the Civil Engineer and M&E Contractor's drawings and specification.

5.0 GROUND FLOORS

5.1 Ground Floor Construction within Proposed Houses

75mm thick fibre reinforced sand cement screed on, 500 gauge damp proof membrane separating layer (as recommended by ground and floor insulation manufacturer) on, 150mm Celotex XR4000 Floor PIR insulation (thermal conductivity 0.022W/mK), (or 50mm thick insulation strips to perimeter) on, precast concrete beam (minimum thermal conductivity 0.025W/mK), on 1000 gauge damp proof membrane, on precast concrete beam and block floor system. (Design and void depth as specified by the Structural Engineer), built off of load bearing wall construction. Overall ground floor build-up is to achieve a minimum U-value of 0.13W/m²K. Damp proof membrane is to be lapped and taped and taken up and taped around all incoming pipe and service penetrations, in accordance with specialist manufacturer's installation guidance and recommendations. Ventilation is to be provided in two opposing external substructure walls with free path between voids and to all parts to give an actual opening equivalent to at least 15000mm² of free air flow at 1m maximum centres. Ventilators are to be maximum 450mm from internal corners. Intermediate stair wells are to have a block omitted at 1m maximum centres, with a suitable lintel over (to Structural Engineer details and specification) to maintain air flow through the sub-floor void. All telescopic ventilators are to have a cavity tray over. Air bricks are not to be positioned under doorways or entrances. A continuous Hylod, or similar approved, 2000 gauge polythene DPC is to be provided to internal leaf of blockwork below level of precast concrete beams. Minimum depth of sub floor ventilation void is to be in accordance with the Structural Engineer's details and specification. The floor insulation should abut against the blockwork inner leaf. Cavity wall insulation to fill the full extents of the cavity, height, width and depth in accordance with the MMA insulation guidance.

5.2 Cold Water Supply

Insulate throughout length of cold water supply pipe when it enters the building less than 750mm from the outside face of the external wall. Seal the damp proof membrane where pipes pass through the floor. Insulation thickness depend on pipe diameter and thermal conductivity, refer to British Standard. Water Authority supply pipe size and material is to be in accordance with local water authority regulations/requirements. The supply pipe must be continuous from the water meter to the internal stopcock. Refer to Utilities Consultant and Civil Engineer's drawings for full details of all proposed incoming services.

5.3 Limiting Thermal Bridging & Air Leakage

Install continuous 25mm thick perimeter floor insulation strips. Proposed floor insulation must tightly abut new external masonry walls. Seal all penetrations through the floor with a flexible sealant. Due consideration should be given to the requirements associated with APA Accredited Detail Number FF-GF-02 in respect of thermal bridging around the ground floor and external wall junction. The contractor should refer to this detail prior to undertaking the works.

6.0 UPPER FLOORS

6.2 Upper Floor Construction within Houses

First Floor similar to Ground floor: 75mm thick fibre reinforced sand cement screed with 6mm thick reflective layer on precast concrete beam and block floor system. (Design and void depth as specified by the Structural Engineer), built off of load bearing wall construction.

Second Floor: Generally 22mm thick floor grade tongue and groove chipboard, on timber joists as part of trusses laid in accordance to specialist designers drawings. Chipboard is to be moisture resistant to bathrooms and other wet areas. Chipboard to be stopped 10-15mm short of masonry walls and resulting gap filled with Rockwool isolation strips or similar approved. Typically, joists are to be built in to internal leaf of all external walls. All voids around joists are to be filled with mortar so that no gaps remain. The joint interface between the joist and the mortar is to be sealed with flexible intumescent mastic sealant. Internal floors to have 30 x 5mm lateral restraint straps are to be provided at floor joist level, spaced at maximum c of 1200m centres, with associated blocking and noggins, unless otherwise stated by specialist supplier or the Structural Engineer. Trimmers and trimmed joists/trusses are to be provided to all staircase openings, in locations as indicated on the working drawings and specialist manufacturer's design drawings. Proposed floor finish to have minimum density of 13kg/m³ and 100mm thick mineral wool (minimum density 10kg/m³) laid within depth of joists to provide minimum 40db sound reduction from airborne sound (unless approved joist/truss supplier's technical literature confirms otherwise). This applies to upper floors between a room and a bedroom or room containing a W/C. Ceiling finish is to be 1 no. layer of 15mm thick British Gypsum wallboard (minimum 10kg/m² mass per unit area, or similar approved, to provide minimum fire resistance of 30 minutes. Ceiling is to receive nominal 3mm thick skin finish, unless otherwise preferred by Luminair Developments. Consideration should be given to the impact of placing light fittings within the ceiling finish. Important Note: The appointed timber truss manufacturer is to provide designs based on the working drawings, which are to be submitted to the Architect and the Structural Engineer for approval, prior to manufacture.

6.5 Limiting Thermal Bridging & Air Leakage

Due consideration should be given to the requirements associated with APA Accredited Detail Number FF-IF-01 around the junctions with the external walls. The appointed contractor(s) should familiarise themselves with the above mentioned details, prior to undertaking the works.

7.0 EXTERNAL WALLS 7.1 Facing Brickwork & Block Inner Leaf

366mm Cavity external wall (U-value 0.13W/m²K) construction comprising: 102.5mm approved facing brick outer skin laid in stretcher bond (except where elevations show otherwise) with bucket handle joints (mortar mix and brickwork substrate resting where required by Structural Engineer). Facing brickwork to extend min 3 courses below finished ground level. For details of external finishes, see materials schedule and specification. 150mm cavity partially filled with Celotex CW4000 (thermal conductivity 0.022W/mK), or similar approved, 100mm thick lightweight block inner leaf, or similar approved. Density to be between 450kg/m³ and 800kg/m³. Strengths to be as indicated on the GA plans and as specified by the Structural Engineer. Internal wall finish is to be 2 coats plaster and skim coat to non thickness of 13mm. Provide stainless steel wall ties to BS1243 as specified by Structural Engineer, set at 450mm vertical and 900mm horizontal staggered centres unless specified otherwise by SE. Specification to be confirmed by the structural Engineer. DPC to be 2000 gauge polythene in accordance with BS743 and located minimum 150mm above external ground level. Refer to detailed construction drawings. Cavity wall insulation continuous to full extents of the cavity, height, width and depth in accordance with the manufacturers insulation guidance. All fittings to the external leaf (for example canopies and railings) are to be fixed in accordance with Structural Engineer's instructions. Generally, close cavity at door and window openings with a proprietary fire rated insulated cavity closer (minimum thermal resistance path through the closer of not less than 0.45m²/K). All windows and doors are to be positioned within opening in such a way to avoid cold bridging and specification. All openings in external walls to have 30mm insulation with window manufacturers design and specification. All openings in external walls to have cavity trays over with minimum 2no. weep holes at 450mm maximum centres. All window jambs are to be constructed in accordance with APA Accredited Detail Number FF-WD-Q4. Generally, continuous cavity fire stops are to be provided at all separating wall and floor junctions in the form of an oversized sleeved mineral wool cavity sock, by Rockwool or similar. Cavity fire stops are to be installed continuously to eaves and verge. Cavity wall ties are to be provided at maximum 225mm centres around all window and door openings and no more than 225mm from either side of all masonry expansion joints.

7.4 Masonry Expansion Joints

Masonry expansion joints are to be provided in accordance with the GA plans, elevations and Structural Engineer's details. Refer to working drawings for locations. Wall ties are to be placed within 225mm (either side) of all movement joints.

7.5 Galvanised Steel Lintels

Stainless steel insulated cavity lintels designed, tested and manufactured fully in accordance with the British standard, with integral insulation to suit cavity width. Openings over 1.2m wide may require 'topping up' until the brickwork over has matured. Minimum bearing of lintels to be 150mm each end bearing to be onto complete block. Lintels above internal doors are to have minimum 100mm end bearing up to 1200mm clear span and 150mm bearing over 1200mm openings. All lintels are to be in accordance with the manufacturer's schedules and calculations. All lintels are to be installed in accordance with the manufacturer's installation guidance and recommendations. Where the lintels approved for use have a continuous steel bottom plate, insulated plasterboard is to be used at the head of the window internally. Insulated plasterboard is to comprise of minimum 25mm insulation (minimum thermal conductivity 0.025W/mK) and 12.5mm thick plasterboard. To be in accordance with APA Accredited Detail Number FF-WD-01. Consideration should however be given to the location of the background trickle ventilators when specified in the top of the window frames. Important Note: The appointed lintel manufacturer is to provide schedules and calculations for all cavity wall lintels, which are to be submitted to the Architect and Structural Engineer for approval, prior to manufacture.

7.6 Insulation

Thermal Insulation is to be provided as noted previously within this document. All insulation products proposed for use with the development are to have a GWP of less than 5.

7.7 Cavity Trays

DPC cavity trays are to be filled over all external cavity lintels. The length of the trays to extend 150mm beyond the lintel ends and have stop ends. Allow at least 2 no. proprietary plastic pre-formed weep holes per opening, colour to match brickwork, not more than 450mm apart. Cavity trays are to be filled over all air bricks bridging the cavity. The cavity tray is to extend 150mm minimum each side of bridge. Proprietary weep holes at 450mm

maximum centres (colour to match mortar). Continuous horizontal cavity trays are to be provided immediately above all fire barriers at all separating floor levels. In situations where a roof abuts an external wall, a stepped cavity tray is to be installed above the roof raking down the line of said roof. This terminates above Code 4 lead flashing also running along the line of the roof with minimum 150mm up-stand lead work to be installed strictly in accordance with Lead Sheet Association instructions and recommendations. Proprietary, plastic pre-formed weep holes (colour to match brickwork) are to be located at maximum 450mm centres.

8.0 PARTY WALLS

8.1 Masonry Walling Walls (Between Dwellings)

300mm masonry party wall (U-value 0.00W/m²K) construction comprising: 2 No. leaves 100mm thick concrete blockwork. Density to be between 1850kg/m³ and 2300kg/m³. Strengths to be as specified by the Structural Engineer. 100mm cavity fully filled with mineral wool continuous insulation. Cavity and wall ties are to be kept free from snots and debris. Fully fill all blockwork joints with mortar. Ensure that all holes and mortar joints and made good by fully filling with mortar. Provide 225mm long Ancor HRT4 (unless alternative specified by Structural Engineer), or similar approved, wall ties as described in BS EN 845-11-2003 and DD140 and spaced at 450mm vertical and 900mm horizontal centres (not staggered) to all party walls. Walls to be finished with non 13mm plaster. Mortar joints to cover the full thickness of the blocks, leave no voids. Cavities between external and separating walls to be linked and cavity insulation carried across separating walls to room continuous cavity barrier. Alternatively, where manufacturer's technical literature permits, use Rockwool cavity barrier insulation to act as the fire stop. Party wall construction is to continue up to the underside of the roof finish and junction between separating wall and roof filled with a flexible mineral wool fire stop closer. All classes for services are to be kept to a minimum and filled well with mortar. Stagger chases on each side of the wall to avoid them being back to back. Canic, or similar approved, coil mesh 64mm bed joint reinforcement is to be placed within each leaf at 450mm vertical centres for the full height of the party wall, unless otherwise advised by the Structural Engineer. Important Notes: Party wall construction is to be strictly in accordance with Robust Detail E-WM-18. Make sure that there is no connection between the two leaves of masonry except for the wall ties, insulation and foundations. Due consideration should be given to the requirements associated with APA Accredited Detail Number FF-IV-01 in respect of thermal bridging at party wall junctions. It should be noted that the party wall construction, noted previously within this document, is to be adhered to for Robust Detail Compliance.

9.2 Non-Load Bearing Timber Internal Partitions

62mm overall thickness timber partition comprising: Treated softwood timber stud partition, or similar approved. To be finished with 1 no. layer 12.5mm British Gypsum Wallboard, or similar approved, applied to both sides. Where indicated on the working drawings, cavity of studwork is to be filled with 25mm Isover APR 1200 sound quilt insulation, or similar approved, to provide minimum 40db sound reduction from airborne sound. This applies to internal walls between a room and a bedroom or room containing a W/C however, excludes the wall between an En-suite and a bedroom. Important Notes: Moisture resistant plasterboard is to be installed to all kitchens and wet rooms, unless otherwise indicated on the working drawing general arrangement floor plans. Where protected hallways are provided within dwellings, the plasterboard finish to the walls forming the same, are to achieve a minimum of 30 minutes fire resistance. Reinforcement framing is to be provided to support medium to heavy fixtures such as radiators and kitchen wall units etc., where appropriate. Where protected hallways are provided within dwellings, the surrounding partition construction is to continue through the suspended ceiling system to the underside of the structural floor. Services and ducting passing through 30 minute fire resistant partitions are to be sealed/filled with fire collars, acoustically ducting for soil and vent pipes is to be lined with 2no. layers of 12.5mm plasterboard. 12mm thick plywood lining is to be incorporated into the overall wall build-up in wet. Typically, this is to be face fixed to the studwork and all boxing.

10.0 LIMITING THERMAL BRIDGING AND AIR LEAKAGE

Ensure all gaps are sealed around partition perimeters and junctions- apply flexible sealant as necessary. Seal of gaps between masonry walls and openings. Seal all penetrations, around all door and window openings and room perimeters at ceiling and floor level and vertical wall junctions and all other locations where service pipes pass through any walls, partitions and duct casings with expanding foam or electrical suitable flexible sealant. Please refer to APA Accredited Details for Thermal Bridging.

10.2 Manufacturer's Data

Brick, block and mortar manufacturer's suitability for use guidance. Plasterboard manufacturer's installation guides to linings and partitions.

11.0 EXTERNAL WINDOWS & DOORS

11.1 New External Windows & Doors Generally

Windows and doors are to provide opening lights and styles, as indicated on the working drawing elevations. All windows and doors are to include draught excluder, weather strips etc. All windows and doors are to be manufactured in timber effect PVCu; colour in accordance with planning approval and window and door schedules. All entrance doors are to be manufactured in timber effect PVCu and finished to match as close as possible the proposed windows. Sills are to be factory fitted and sized to suit set back of frame and sub-sill detail. The window manufacturer should ensure they refer to this document, in conjunction with the Employer's Requirements, prior to undertaking the works/manufacture. All proposed apertures are to be checked on site, prior to manufacture. Soil profile contractors to receive 25mm moisture resistant MDF internal boards. Each end of frame should have the appropriate BS or BBA certification reference clearly visible. All windows are to be located as identified on working drawings. All windows (including frames etc.) to achieve a minimum U-value of 1.40W/m²K, in accordance with the SAP calculations, unless project dictates otherwise. All external doors (including frames etc.) to achieve a minimum U-value of 1.00W/m²K, in accordance with the SAP calculations, unless project dictates otherwise. All upper floor and other externally inaccessible windows are to be fitted with easy clean hinges, for cleaning purposes. Level thresholds are to be provided where indicated on the working drawings, in accordance with Approved Document M of the Building Regulations. All front entrance doors are to be manufactured to provide a minimum 800mm clear opening. All doors on escape routes, whether or not fire doors, shall not be fitted with a lock, latch or bolt fastenings, unless they are fitted with simple fastenings that can be readily operated from the side approach/ by people making an escape. The operation of any such fastening shall be without the use of a key and without having to operate more than one mechanism. All windows to be in accordance with BS7950.

11.3 Secured by Design (External Windows & Doors)

This specification attempts to highlight some of the key external window and door specification requirements, in respect of complying with Section 2 of Secured by Design. The following is by no means an exhaustive list and the window/door manufacturer should refer to the Secured by Design (New Homes 2014) guidance and the Benchmark certificates prior to manufacture. Provide insulation in all pipes and ducts unless the heat loss from the pipe contributes to the useful heat requirement of the room space. All radiators are to be fitted with thermostatic controlled radiator valves to shut off heat when room temperature is reached, except those fitted in the same room/zone as the location of the room thermostat which provides boiler interlock in accordance with Approved Document L1A of the Building Regulations. Room thermostat(s) is to be provided to switch off the boiler when no heat is required. Additional zoning room thermostats and timing controls are to be provided where the floor area of the dwelling exceeds 150m². Separate timing devices should be provided for room space heating and hot water control. Boilers used for the operation of space heating and hot water systems, for each dwelling, to have a dry NO2 emission level of equal or less than 40mg/Kwh. Important Note: The above specification notes are all subject to specialist M&E Contractor/Plumbing and heating designers details and therefore, may be superseded.

17.2 Flat Roof Construction - Bin Store

Flat roof to be made up of 1 layer of bituminous felt to BS 8747 laid to the recommendations of CP1 144 Part 3 on 1 no. 19mm WBP marine ply sheathing. Roof structure to include timber decking of minimum depth of 25mm forming falls of 1:80 (to rainwater gutter) using timber joists, in accordance with Structural Engineer's design and calculations. Sizes are to take account of the type of roof covering, weight and access for maintenance. Joists to bear DPC, built in to wall. Undersides of roof joists are to be unfinished. Provide 30 x 5mm galvanised mild steel straps at a maximum c of 1200mm centres if specified by S.E., in scenarios where the roof joists run parallel to the external walls. Straps are to be securely fixed to 3no. joists and turned down the internal face of masonry, a minimum of 1500mm. Softwood noggins are to be provided between joists, on line of straps. New roof structure, dead and imposed loads should be calculated in accordance with the British standard. Structural timber should be specified according to strength classes of British Standard in conjunction with Approved Document A of the Building Regulations. Wind loads appropriate to the site location should be calculated in accordance with British Standard and the roof designed to resist wind uplift, holding down straps should be utilised where the self-weight of the roof is not sufficient-check with the local Building control. All roof felt to be applied in accordance with the manufacturer's installation guidance and laid on 19mm WBP marine ply on steel as details depicted. Ventilation of the roof void is to be provided naturally as indicated on the detailed construction drawings. Provide 100mm diameter half round PVCu outlets (refer to working drawings for details) discharging into 63mm diameter down pipes in locations indicated on the general arrangement floor plans and elevations. All jointing, fixing and falls are to be in accordance with the manufacturer's instructions. In accordance with the manufacturer's specifications. Sizes are to take account of the type of roof covering, weight and access for maintenance. Joists to bear DPC, built in to wall. Undersides of roof joists are to be unfinished. Provide 30 x 5mm galvanised mild steel straps at a maximum c of 1200mm centres if specified by S.E., in scenarios where the roof joists run parallel to the external walls. Straps are to be securely fixed to 3no. joists and turned down the internal face of masonry, a minimum of 1500mm. Softwood noggins are to be provided between joists, on line of straps. New roof structure, dead and imposed loads should be calculated in accordance with the British standard. Structural timber should be specified according to strength classes of British Standard in conjunction with Approved Document A of the Building Regulations. Wind loads appropriate to the site location should be calculated in accordance with British Standard and the roof designed to resist wind uplift, holding down straps should be utilised where the self-weight of the roof is not sufficient-check with the local Building control. All roof felt to be applied in accordance with the manufacturer's installation guidance and laid on 19mm WBP marine ply on steel as details depicted. Ventilation of the roof void is to be provided naturally as indicated on the detailed construction drawings. Provide 100mm diameter half round PVCu outlets (refer to working drawings for details) discharging into 63mm diameter down pipes in locations indicated on the general arrangement floor plans and elevations. All jointing, fixing and falls are to be in accordance with the manufacturer's instructions. In accordance with the manufacturer's specifications.

18.0 ROOF INSULATION & VENTILATION
In cold roofs provide insulation consisting of 100mm thick mineral wool roll insulation (thermal conductivity approx 0.044W/mk) laid between the bottom chords of the roof trusses or ceiling joists and 1 no. layer of 200mm thick mineral wool insulation (thermal conductivity approx 0.044W/mk) cross laid over the bottom chords of the roof trusses or ceiling joists. Overall build-up is to achieve a minimum U-value of 0.15W/m²K. High level ventilation within the roof void is to be provided using a dry ridge tie ventilation system, as indicated on the detailed construction drawings, to achieve ventilation equivalent to a 5mm continuous gap. Provide ventilation equivalent to a continuous 10mm over fascia vent, running the full length of the eaves by proprietary vent tiles and ridge vent tiles. Vent tiles are to be at 1000mm centres. Ensure an air path above the roof insulation. All insulation products proposed for use within the development are to have a GWP of less than 5.

19.2 Limiting Thermal Bridging & Air Leakage
Due consideration should be given to the requirements associated with following APA Accredited Details for Thermal Bridging, in respect of the roof construction, as follows: Eaves (Insulation at ceiling level) - APA Detail Number FF-RE-01. Eaves (Insulation at rafter level) - APA Detail Number MCI-RE-04. Gable (Insulation at ceiling level)-APA Detail Number FF-RG-01. Gable (insulation at rafter level) -APA Detail Number MCI-RG-Q2.

19.0 VENTILATION

Approved Document F of the Building Regulations ventilation system IT1 is to be used, which consists of

Internal doors on escape routes, whether or not the doors are fire doors, shall not be fitted with lock, latch or bolt fastenings unless they are fitted with simple fastenings that can be readily operated from the side approached by people making an escape. The operation of any such fastenings shall be without the use of a key and without having to operate more than one mechanism. All internal doors are to provide a minimum clear opening of 750mm, unless noted otherwise within the internal door schedules (i.e. cupboards for example). To ensure good transfer of air throughout the building, there should be an undercut of a minimum area 7,600mm² in all internal doors above the floor finish (equivalent to a 10mm undercut to a 762mm door). Notwithstanding the above mentioned maximum allowable threshold gap below a fire door. Please refer to Luminair Developments' finishes schedule for details of required finish etc. Please refer to specified specialist manufacturer's technical non-loadbearing studwork details and guidance for information relating to provisions to be made when typing out the structural openings for all internal doors (i.e. an allowance should be made for the fixing of a timber packer to the vertical studs at all door jambs, to aid the fixing of the softwood linings etc.).

12.1 Fire Doors Generally

Fire ratings for fire door assemblies are given in minutes and noted in the door schedule. Door leaf must have a full test report to the British Standard and have BWF Certifier Accreditation. The complete fire door assembly, including its frame, intumescent seals, hinges, glazing and ironmongery must perform to the British Standard. The door assembly must carry a permanent and taper evident label. The manufacturer's specific and comprehensive installation instructions must be followed. Fire doors should be fitted with a self-closing device, where noted on the internal door schedule, in accordance with Approved Document B of the Building Regulations.

13.0 AIR LEAKAGE

All windows and external doors to have suitable mastic sealant applied to front and back of frames in accordance with manufacturer's recommendations. Provide adequate draft stripping to loft hatches and roof access doors. Separating/party walls and floors to be constructed and sealed.

14.0 STAIRCASES

New staircases are to achieve full compliance with Approved Document Part K of the Building Regulations. Headroom at stairs and landings to be minimum 2000mm, unless otherwise detailed. Risers are not to be open. Handrails to be 900mm above pitch line and landings. Landings should be provided at the top and bottom of every flight and the width and length should be at least as great as the width of the flight. A door may swing across a landing providing it is infrequently used (i.e. a store cupboard door) and leaves a minimum of 400mm clear space across the full width of the flight. Please refer to the working drawings for precise rise and goings etc. No opening in the balustrade is to allow the passage of a 100mm diameter sphere and should not be readily climbable. Where tapered treads are formed, treads should measure minimum 50mm at the narrow end and min 234 going, mid-width. Maximum pitch of 42°. Important Note: The appointed staircase manufacturer is to provide designs based on the working drawings, which are to be submitted to the Architect for approval, prior to manufacture.

15.0 FLASHINGS & LEAD WORK

Code 4 stepped and code flashing dressed over ties by at least 150mm (see manufacturer's recommendations) and turned up brickwork 150mm min or to Lead Sheet Association requirements. Flashing fixed in position with lead wedges 25mm minimum into brickwork joint and pointed. Cavity trays are to be provided above lead work where external wall becomes internal. All lead work is to be carried out in strict accordance with the Lead Sheet Association's recommendations and guidance.

16.0 STEELWORK

Corrosion protection to all steelwork is to be as specified by the Structural Engineer. Structural steelwork is to be fire protected to a minimum 30 minutes. All steelwork and associated connections are to be in accordance with Structural Engineer's drawings and specification.

16.1 Steel Beams & Columns

Any steelwork (to Structural Engineer's calculations) to be built-in solid (supported on pad stones to Structural Engineer's design) and levelled with steel shims provided and treated with either: Finished with intumescent paint, nullifier or similar approved, to achieve a minimum of 30 minutes fire resistance where appropriate or, Encased with suitable number of layers of cement bonded particle board, or similar approved, applied in strict accordance with specialist manufacturer's recommendations. To achieve minimum 30 minutes fire resistance where appropriate. All joints are to be sealed with intumescent mastic, or similar approved.

17.0 ROOFS

17.1 Pitched Roof Construction Generally

Where possible, the main roofs are to generally be formed using prefabricated timber trussed frames. Manufacture in accordance to specialist design and calculations and the requirements of BS6399, Part 2 & 3, BS5268, Part 2 & 3, BS4978. Sizes are to take account of the type of roof covering and weight. Roof pitches are to be as shown on working drawings. Roof trusses are to bear on a minimum 100 x 75mm treated softwood timber wall plate strapped to blockwork at maximum c of 1200mm with 30 x 5mm galvanised mild steel straps taken across 3rd noggad trusses, as specified by the Structural Engineer. Where applicable, gable ladders are to be specified by truss manufacturers and fixed to last truss (and built solidly in to the external wall). External walls are to be built around gable and to finish level with the top of the gable ladder. Provide and trim for a nominal 520 x 520mm roof access hatch. In locations indicated on the working drawings. Hatch to be located a minimum of 300mm from all vertical internal wall faces. Roof access space hatches are to be insulated and draught sealed with a bolt or catch to compress the seal. Roof access hatches are required to provide a minimum of 30 minutes fire resistance where indicated on the working drawing general arrangement floor plans. Undersides of roof trusses (at second floor level) are to be finished with 1 no. layer of 15mm British Gypsum wallboard, or similar approved, to provide minimum 30 minutes fire resistance. Provide 30 x 5mm galvanised mild steel straps at a maximum c of 1200mm centres along ceiling and verge levels. In scenarios where the roof trusses and floor joists run parallel to the external walls. Straps are to be securely fixed to 3no. trusses/joists and turned down the cavity face, of the inner leaf of masonry, a minimum of 1500mm. Treated softwood timber packing pieces are to be provided between the end of the truss/joist and wall. Softwood noggins are to be provided between trusses/joists, on line of straps. New roof structure, dead and imposed loads should be calculated in accordance with the British standard. Structural timber should be specified according to strength classes of British Standard in conjunction with Approved Document A of the Building Regulations. Wind loads appropriate to the site location should be calculated in accordance with British Standard and the roof designed to resist wind uplift, holding down straps should be utilised where the self-weight of the roof is not sufficient-check with the local building control. Selected roof tiles are to be suitable for the pitch stated on the working drawings. All roof tiles are to be laid and mechanically fixed in accordance with BS5534 and the manufacturer's installation guidance and laid on Glidewat Protect VP400 vapour permeable underlay, or similar approved.

NB: Carport/Bat Roost to have Bituminous felt and not modern polymer tubular membrane material. Ventilation of the roof void is to be provided via proprietary vent tiles and ridge vent tiles, Glidewat FV100, or similar approved as indicated on the detailed construction drawings. Provide 100mm diameter half round PVCu gutters (refer to working drawings for details) discharging into 68mm diameter PVCu down pipes in locations indicated on the general arrangement floor plans and elevations. All jointing, fixing and falls are to be in accordance with the manufacturer's instructions. All penetrations through the proposed roof finishes (i.e. soil and vent pipes) are to be installed and weatherproofed in accordance with the manufacturer's guidance. Sleeved mineral wool fire stop cavity barriers (oversized and friction fitted within the cavity) should be provided at eaves level and full height down gable at separating wall ends, in accordance with the detailed construction drawings. In addition, all bowed eaves are to be filled with mineral wool, or similar fire resisting material, for at least the width of the party walls. All fire stopping is to be interlinked accordingly.

17.2 Flat Roof Construction - Bin Store

Flat roof to be made up of 1 layer of bituminous felt to BS 8747 laid to the recommendations of CP1 144 Part 3 on 1 no. 19mm WBP marine ply sheathing. Roof structure to include timber decking of minimum depth of 25mm forming falls of 1:80 (to rainwater gutter) using timber joists, in accordance with Structural Engineer's design and calculations. Sizes are to take account of the type of roof covering, weight and access for maintenance. Joists to bear DPC, built in to wall. Undersides of roof joists are to be unfinished. Provide 30 x 5mm galvanised mild steel straps at a maximum c of 1200mm centres if specified by S.E., in scenarios where the roof joists run parallel to the external walls. Straps are to be securely fixed to 3no. joists and turned down the internal face of masonry, a minimum of 1500mm. Softwood noggins are to be provided between joists, on line of straps. New roof structure, dead and imposed loads should be calculated in accordance with the British standard. Structural timber should be specified according to strength classes of British Standard in conjunction with Approved Document A of the Building Regulations. Wind loads appropriate to the site location should be calculated in accordance with British Standard and the roof designed to resist wind uplift, holding down straps should be utilised where the self-weight of the roof is not sufficient-check with the local Building control. All roof felt to be applied in accordance with the manufacturer's installation guidance and laid on 19mm WBP marine ply on steel as details depicted. Ventilation of the roof void is to be provided naturally as indicated on the detailed construction drawings. Provide 100mm diameter half round PVCu outlets (refer to working drawings for details) discharging into 63mm diameter down pipes in locations indicated on the general arrangement floor plans and elevations. All jointing, fixing and falls are to be in accordance with the manufacturer's instructions. In accordance with the manufacturer's specifications.

18.0 ROOF INSULATION & VENTILATION
In cold roofs provide insulation consisting of 100mm thick mineral wool roll insulation (thermal conductivity approx 0.044W/mk) laid between the bottom chords of the roof trusses or ceiling joists and 1 no. layer of 200mm thick mineral wool insulation (thermal conductivity approx 0.044W/mk) cross laid over the bottom chords of the roof trusses or ceiling joists. Overall build-up is to achieve a minimum U-value of 0.15W/m²K. High level ventilation within the roof void is to be provided using a dry ridge tie ventilation system, as indicated on the detailed construction drawings, to achieve ventilation equivalent to a 5mm continuous gap. Provide ventilation equivalent to a continuous 10mm over fascia vent, running the full length of the eaves by proprietary vent tiles and ridge vent tiles. Vent tiles are to be at 1000mm centres. Ensure an air path above the roof insulation. All insulation products proposed for use within the development are to have a GWP of less than 5.

19.2 Limiting Thermal Bridging & Air Leakage
Due consideration should be given to the requirements associated with following APA Accredited Details for Thermal Bridging, in respect of the roof construction, as follows: Eaves (Insulation at ceiling level) - APA Detail Number FF-RE-01. Eaves (Insulation at rafter level) - APA Detail Number MCI-RE-04. Gable (Insulation at ceiling level)-APA Detail Number FF-RG-01. Gable (insulation at rafter level) -APA Detail Number MCI-RG-Q2.

19.0 VENTILATION

Approved Document F of the Building Regulations ventilation system IT1 is to be used, which consists of

background ventilators and intermittent extract fans. General layouts are shown on the working drawing general arrangement floor plans however; these are to be verified by a specialist designer. Purge, background and mechanical ventilation requirements are all subject to specialist designer's/manufacturer's details. Natural ventilation is to be provided within all cycle and refuse stores, in accordance with the working drawings.

20.0 SMOKE DETECTION, CARBON MONOXIDE ALARMS & ESCAPE SIGNAGE

All new houses should be provided with fire detection and fire alarm systems. In accordance with the relevant recommendations of BS5839-6:2013 Code of Practice for the Design, Installation and Maintenance of Fire Detection and Alarm Systems in Dwellings to at least Grade D Category LD3 standard. Smoke and heat alarms must be mains operated and conform to BS 5446-1:2000 or BS 4446-2:2003 respectively: Fire Detection and Alarm Devices for Dwellings, Part 1 Specification for Smoke Alarms, or Part 2 Specification for Heat Alarms. They should have a standby power supply such as a battery (either non-rechargeable or rechargeable) or capacitor. More information is given in clause 15 of BS 5839-6. At least one approved smoke alarm unit must be fitted in circulation areas at each floor level in every dwelling and be positioned a maximum of 7m from kitchen or living room doors, maximum of 3m from bedroom doors and a minimum of 300mm from light fittings and walls. Large circulation areas may require two units; check Approved Document B of the Building Regulations. Alarms must be connected to a separately fused mains electricity supply with a transformer (if needed), a three hour capacity battery back-up and where more than one unit is fitted within a dwelling, they must be interconnected. The installation must comply with the current IEE regulations. Detectors should not be placed over stairwells. Where the kitchen area is not separated from the stairway or circulation space by a door, there should be a compatible interlinked heat detector of heat alarm in the kitchen, in addition to whatever smoke alarms are needed within the circulation spaces. Carbon Monoxide detectors are to be located in accordance with drawings but, generally adjacent the boiler location and in any room containing a solid fuel appliance (e.g. open fire).

21.0 ELECTRICAL SERVICES

Electrical installation - refer to services drawings for the electrical layout only. Particular consideration should be given to the need to de-rate cables which are covered or surrounded by thermal insulation. Switches, outlets and controls are to be located as follows: Any service control needed by the operator or read on a frequent basis, or in an emergency, should be included within the height band of 450-1200mm from finished floor level. Please refer to diagram 22 within Approved Document M of the Building Regulations. Switches for permanently wired appliances are located between 450mm and 1200mm above the floor, unless needed at a higher level for particular appliances. Simple push button controls that require limited dexterity are not more than 1200mm above the floor. The operation of switches, outlets and controls does not require the simultaneous use of both hands, except where this mode of operation is necessary for safety reasons. Switched socket outlets indicate whether they are 'on'. Mains and circuit isolator switches clearly indicate that they are on or off. Front plates contrast visually with the internal workings. Installation is to be carried out in accordance with the current IEE regulations, the electricity supply regulations, and CBSE guides and to the approval of the Electricity Board. Where ducts, conduits and cables pass through separating or load bearing walls, the surrounding gap is to be filled with intumescent mastic or expanding foam to maintain fire rating of wall. All external space lighting light fittings are to be dedicated low energy fittings and controlled by movement detecting shut-off devices (PIR) or timer switches. All burglar security lights are to have a maximum wattage of 150W and are to be fitted with movement detecting shut-off devices (PIR) and daylight cut-off devices. All other security lighting is to be specially designed to accommodate CFL, planning conditions and ecological experts advice, luminaries or strip lights and be fitted with dawn-to-dusk sensors or timers. All internal energy efficient light fittings must be capable of only accepting lamps having an average luminous efficacy not less than 40 lumens per circuit watt. All fittings with the lamp, control gear and appropriate housing, reflector, shade or diffuser. All external energy efficient light fittings will be capable of only accepting lamps having an average luminous efficiency not less than 40 lumens per circuit watt. All fittings will accommodate only compact fluorescent lamps (CFL) luminaries or strip lights and be controlled by a time clock or daylight sensor. Electricity and primary heating fuel consumption data must be displayed to occupants via a correctly specified energy display panel. The electrical contractor is to provide Luminair Developments with a whole house electrical certificate. For sealed and suitable number of layers of cement bonded particle board, or similar approved, applied in strict accordance with specialist manufacturer's recommendations. To achieve minimum 30 minutes fire resistance where appropriate. All joints are to be sealed with intumescent mastic, or similar approved.

All fittings will be capable of only accepting lamps having an average luminous efficacy not less than 40 lumens per circuit watt. All fittings will accommodate only compact fluorescent