GENERAL CONSTRUCTION GUIDANCE NOTES

GENERAL NOTE
Before commencement of work, positions of all existing services including drainage are to be ascertained & any protective or diversion works are to be carried out as necessary. Severn trent approval may be required - contractor to check with relevant authority. Existing drainage inverts to be determined to establish adequate falls from new drainage fittings. Any necessary propping and strutting is to be carried out to ensure stability of the structure during building operations. All materials & workmanship are to comply with all building regulations, british standards & codes of practice. All timbers are to be double vacuum pressure impregnated with' Protim Prevac 80' or similar approved preservative, with all site cuts, ends & holes etc to be treated with 'Protim' cut end preservative liberally applied by brush.
Client/builder to carry out site investigation & results to be forwarded to the building control body to establish the levels of contamination if any & the suitability of ground conditions before the works commence.
Builder to check all load bearing elements on site before any works commence on site. The drawings are prepared to comply with the current building regulations & are to be read in conjunction with all relevant specialist drawings, calculations & details where appropriate. All dimensions are to be checked on site by builder before work commences, and adhered to in all cases including heights etc. As noted on the drawings.
KPD takes no responsibility for any alterations to these drawings.
These drawings are for building regulation approval only.
Any work undertaken before approval is obtained is all at the risk of the client and builder. KPD takes no responsibility for any work undertaken at this stage. Please note these drawings were prepared in compliance with planning and building regulations which were in force at the time of preparation. KPD accepts no responsibility for drawings relied upon, which by virtue of a change in legislation and/or to planning guidelines or building regulations, render the drawings non-compliant with such legisation/guidlines after the preparation of such drawings. KPD accepts no responsibility for any alterations from the approved drawings. Nothing in our appointment or provision of drawings shall be deemed to create any appointment as or obligations as a duty holder pursuant to the regulation 7 of the cdm regulations 2015.
Boundaries shown are for identification only and are not to be taken as a legal definition.

Notes: 1. Upon commencement of the works the size and position of all existing structural elements as shown on the drawing are to be verified by the contractor. 2. Existing timbers shall be exposed to allow complete timber and damp survey as necessary. All timbers shall be treated or replaced in accordance with the specialists recommendations. All timber connections are to be examined by the contractor to verify their integrity and made good of deemed necessary by the inspector. Where wall plates required replacement the new timbers are to be secured by 30x2.5mm galvanised mild steel straps at 1200mm max. ctr's and screwed to existing wall with sno. 50mm long no.12 wood screws in plastic plugs. 3. All new timbers shall be strength class C16 to BS5268 part 2 unless noted otherwise. All new timbers shall be strength class C16 to BS5268 part 2 unless noted otherwise. All new timber connections are to be formed using joists hangers and or framing anchors and clips supplied by 'Expamet' or similar. 4. All existing masonry shall be examined by the contractor any cracked or flaked brickwork shall be repaired or rebuilt to the satisfaction of the client. any loose or soft mortar shall be raked out and repointed. 5. All new steelwork shall comply fully with BS5950. The contractor shall take all necessary site dimensions and levels prior to commencement of fabrication. 6. The contractor shall be responsible for the stability of the existing building whilst carrying out the proposed alterations all temporary works needing propping and shoring to the existing structure shall be designed by the contractor. 7. All new brickwork to have a compressive strength of 21N/mm sq. built in 1:1:6 cement:lime:sand mortar unless stated otherwise. 8. Concrete padstones to be grade C35 10mm maximum size aggregate with 300kgs/m3 o.p.c. 9. Floor joists to be doubled up below new baths 10. Joist size to be deemed by structural engineer Building regulations approval, cdm regulations, health & safety, temporary work and interim stability

1. The builder shall comply with the building regulations. Any work carried out on site prior to full building regulation approval from the building control body is entirely at the risk of the builder. 2. The builder shall comply with all aspects of the construction (Design & Management) regulations 2015. 2.1 The builder shall carry out his own risk assessments for all aspects of the Works. 2.2 The builder shall provide method statements for the following items of work or items as requested: a) Excavation below existing foundation levels when in close proximity to existing foundations b) Underpinning c) Working with machinery when adjacent to or over existing occupied buildings d) Erection/installation of steelwork adjacent to or over existing occupied buildings 3. The builder shall maintain records of all on site changes to the drawings and calculations and provide a full set of "marked-up" drawings to show the "as-built" construction. 4. The builder is reminded that the structures stability relies on all structural elements to be completed and cured. The builder is required to consider his construction methods/sequences and to assess temporary works and bracing requirements to ensure the interim stability of partially completed

THE PARTY WALL ACT 1996: The client is responsible for conforming with the Party Wall Act The client is responsible for conforming with the Party Wall Act 1996 and obtaining the necessary neighbour agreements in the required period depending on the extent of work to the party wall/boundary.

SITE CLEARANCE
Site to be cleared of all vegetable matter, turf, concrete etc to a minimum depth of 200mm below existing ground level.

FOUNDATIONS AND FOOTINGS
New ground floor external walls to be taken down to concrete strip or trench fill foundations 600 wide Internal walls to be taken down to strip foundations 440 x 200 thick. Depths to suit site conditions and to Local Authority approval prior to pouring concrete but not less than 1000mm deep.

Foundations to be grade C.20P to BS.5328:1981 (min. mix 1:3:6) concrete incorporating 2 No. 16mm diameter m/s continuation reinforcing bars set centrally under each wall leaf and on the neutral axis, lapped min 200mm and bent neatly around corners, if deemed necessary by structural engineer.

Build up external walls in two skins of 7N solid dense concrete blocks using mortar mix 1:3 up to one brick depth below finished ground level. Fill cavity with sand cement mix.

DAMP PROOF COURSE
To be Andersons XTRA-LOAD ELITE or equal approved polymeric DPC. To be installed to inner and outer skins of cavity walls and to all internal blockwork walls, to be located minimum 150mm above finished ground levels to avoid the raise of water through absorption. All joints to be lapped min. 150mm (basic Radon measure).

VERTICAL DPC; at abutments of external cavity wall to solid 215 wall.
Cavity fill to finish minimum 225mm below.

Cavity trays and weepholes to be provided above structural openings and base of cavity to provide basic radon protection. Weep holes at 450mm centres over lintels

Allow for suitable cavity tray and lead flashing to roof abutment as required GROUND FLOOR
If Ground conditions permit Ground bearing floor slab to be used to specification as follows:
GROUND FLOOR SLABS AND INFILLS:
Excavated site area to be treated with weed killer.
75mm reinforced cement/sand screed on 500-1000 gauge seperation layer on 150mm Kingspan Kooltherm K103 overslab insulation (25mm edge insulation) on 100mm 100C 20P mix concrete slab, 1200gauge polythene DPM carried up at edges and lapped with dpc. If joints are required in dpm they are to be welted and tape sealed. New to existing dpm also to be welted and tape sealed.
50mm sand blinding on 150mm min crushed stone well watered and rolled hardcore.

25mm insulation to perimeter of all floors.
Construction to achieve U value of better than 0.14.

If Ground conditions don't permit using ground bearing slab then use the following suspended floor specification:

GROUND FLOOR Minimum of 150mm void under, Dense concrete block and precast concrete beam system to structural engineers and specialist suppliers design. Joints to grouted and trowelled off smooth to recieve 1200g PIFA polythene dpm with 150mm min laps & to be carried up walls to lap with DPC.
All joints in dpm to be welted, taped and sealed. 100mm Kingspan Thermafloor TF70 with 500g polythene separating layer laid over.
75mm sand cement screed to include underfloor heating system.
25mm insulation to perimeter of all floors.

Suspended concrete floor to be designed, manufactured and installed in strict accordance with the manufacturers & suppliers details and instructions.

Kingspan or similar approved insulation to be fitted in accordance with the manufacturers details and instructions.

Ventilation to underfloor void - periscopic vents at max 1.8m centres in external walls. The openings to be large enough to give an actual open area of at least the equivalent to 1500sq.mm per horizontal metre run of wall.
All periscopic vents to have pcc lintel over in inner leaf.
At least one periscopic vent within 450 of each corner/ return.

EXTERNAL WALLS
Construction to comprise: 103 brick to match existing, 100mm cavity filled with 100mm Drytherm32 100mm blockwork inner lining to be 62.5mm insulated plasterboard on dabs and skim finish. achieving U-val 0.18 W/m²K
Both leaves of wall construction to be tied together using stainless steel vertical twist ties at 900mm horizontal, 450mm vertical centres and no greater than 300mm at reveals.
Cavities to be closed at reveals with proprietary fire proof closer such as Thermabate.
Brickwork and blockwork attached to existing with Simpson Strong tie masonry connectors or similar ties

WALL TIES
Two and a half wall ties per square metre of masonry with a maximum horizontal spacing is 900mm and a maximum vertical spacing is 450mm. Each wall tie to be set a minimum of 50mm into both masonry leaves. Cavity wall ties to be stainless steel and 225mm in length. Three courses of blue engineering bricks in 1:3 mortar to all 215mm external walls.

BONDING OF NEW AND EXISTING WALLS
New walls to be secured to existing walls by use of stainless steel Firfix or Crocodile (or S.A.).
Fixings in accordance with manufacturers instructions complete with weather strip and mastic pointing. 100mm Dpc behind all wall end ties.

CAVITY
To be cleared of all mortar droppings and closed at all openings at top of wall cavity closers . Lean mix concrete cavity fill to 225mm min. below DPC.

MORTAR
Shall be at least in strength 1:1:6 Portland cement/lime/fine aggregate mortar measured by volume of dry materials up to the proportions given in BS.5628. mix to be 1:1/2:4 below dpc.

LIMITING AIR LEAKAGE
The cavity wall insulation must be taken down below damp course level, finishing 150mm below the underside of the floor slab insulation. The cavity wall insulation and roof insulation
must meet at the top of the wall
Cavity wall insulation must be carried up to the full extent of gable walls.
A 25mm upstand of insulation must be provided around the perimeter of floors, including where the floor slab touches outside wall (usually at door thresholds) using Celotex T-breaktm TB3000 boards.
All cavity closers must be fire proof and insulated.
All details are designed to comply with the robust construction manual details for air leakage and thermal bridging. A suitably qualified person should be appointed to inspect all works during construction, and shall issue a signed report on completion and issue to local authority.

STRUCTURE

FOUNDATIONS, STEEL BEAMS, PURLINS, RAFTERS, LINTELS, FLOOR JOISTS, PADSTONES & BEARINGS, SUSPENDED SOLID FLOORS, BLOCK STRENGTH, LATERAL RESTRAINT, SCREEN WALLS, RETAINING WALLS, ALL MOVEMENT JOINTS , PIER SIZES & STRUCTURAL STABILITY OF WALLS, BUTTRESSES ETC., TO BE DESIGNED BY STRUCTURAL ENGINEER.
New steel beams inserted together with padstones etc to carry existing/new construction all to structural calculations.
HALF HOUR FIRE PROTECTION; to structural steel beams supporting floors and steel columns to be encased with 12.5mm Fireline plasterboard and skim to give 30mins fire resistance.
If restricted space around beams then coat the steelwork with intumescent paint to the thickness required by the manufacturer to provide 30mins fire protection

Lintels to be insulated in external walls.

Foundations within 5m of any trees to be adequate for root protection.
GENERAL
All work to be carried out in full accordance with current Building Regulations and 'robust details' as applicable. All on site operations to be carried out in full accordance with current Health & Safety Regulations and CDM Regulations 1994 as applicable.

STUDWALLS
1No layers of 12.5mm Gyproc wall board ten (with a minimum mass per unit area of 10Kg/m2) fixed each side of studs, at 150mm crs, with 40mm non-ferrous driwall screws to 100x50 sw treated studs at 450mm crs for 900mm boards + 600mm crs for 1200mm boards. With a sound absorbent layer of Isowool Acoustic partition roll fully filling the wall cavity. All joints to be well sealed. 100x50mm noggins to be fixed to support ends of boards and 900mm crs vertically between studs.

Stud walls to be skimmed with 5mm thistle board finish.
Gyproc moisture resistant board to be used in bathroom areas.

Fill all gaps around internal walls to avoid air paths between rooms.
Where partitions occur at first floor level and run parallel with joists, additional joist is to be inserted and the two bolted together.

Accoustic sealant and intumescent/ accoustic sealant on the 30min walls and ceiling around the garage.

TIMBER TREATMENT
All existing timber to be checked for damage and repaired/replaced with similar materials as necessary, under the guidance and agreement of the conservation officer and the structural engineer.
All existing timbers in roof spaces to be treated against rot and infestation.
All structural timber to be pressure impregnated with an approved fungicide/insecticide preservative fluid all in accordance with B
S 4978:1975 and BS 5268.
CEILINGS
To be 12.5mm plasterboard with scrim taped joints and 3mm skim finish. 50x50mm noggins to be provided to all unsupported edges.
LINTELS
To be either Catnic or similar approved (or to structural engineers details) to have minimum 150mm end bearing.

PITCHED ROOF 0.15 W/m2K
To be plain tiles to match existing main roof pitch and fixed in accordance with BS5534 pt1 1978(1985) tiles to have 100mm maximum gauge headlap 65mm minimum, nailed using 38x12g aluminium alloy nails laid on 38 x 25mm s.w. tanalised class A battens, battens secured with galvanised clout nails.
Tiles twice nailed every third course and all tiles to be twice nailed at ridge, eaves and verge. Continuous proprietary eaves skirt at eaves.
Tyvek Untearable Breathable sarking on timber rafters at 450c/c. Rafter depth to suit span and to be specified by structural engineer.
100mm Kingspan K107 insulation between rafters leaving a minimum of 50mm between sarking and insulation gap provided by using 25x25 treated batten fixed to both sides of all the rafters.
62.5mm Kingspan K118 beneath rafters with all joints taped using self adhesive foil tape.
All insulation boards fitted in accordance with manufacturers detailsand instructions.
Wall plate to be bedded on mortar and fixed down to the inner leaf of the cavity wall with 30 x 5mm galvanised steel straps 1000mm long at 2000mm max. centres. All fixings to steel straps to be plugged and screwed to masonry.

Glidevale AV50 AbVent or similar approved ventilated abutment flashing to provide 5000sq.mm ventilation per metre run of ridge abutment.
Ridge to be Dry ridge system to allow for roof ventilation.

FLAT ROOF 0.15 W/m²K
Flat roof to be a warm roof with fully adhered GRP single ply membrane on 150mm thick Kingspan Thermaroof TR27 LPC/FM on Vapour control barrier on 18mm plywood deck on Timber Joists @400ctrs. built into internal walls or on hangers where reqd. (depth of flat roof joist to suit span)
12.5mm plasterboard with 3mm skim finish
Lateral restraint: 30x5mm mild steel straps at 2.0m max centres fixed along joists or perpendicular to joists with 38x150 noggins. Strap taken down cavity by a minimumof 450mm.
Roofing and insulation all bonded in accordance with relevant manufacturers details

EAVES & SOFFITS
Soffitts and fascias to be upvc or painted or stained, treated timber

DOORS & WINDOWS
Glazing in doors which is wholly or partially within 1500mm from floor level and any glazing between finished floor level and 800mm above that level in internal and external walls and partitions should conform to at least Class C of BS 6206.
However if the smaller dimension of the pane is greater than 900MM, it should conform to at least Class B of BS 6206. In both cases glass must be marked in accordance with BS 6206.
Window and Door Reveals
All window reveals to be formed by closing cavity at jambs and cills with Thermabate or similar approved, insulated cavity closer to avoid cold bridging, installed strictly in accordance with manufacturers instructions.

ALL EXTERNAL DOORS AND WINDOWS TO BE DOUBLE GLAZED
Windows and doors to be glazed with 24mm minimum sealed double glazed units comprising Low E glass or K glass of 0.15 emissivity and 16mm gap giving a U value of 1.5W/sq.m K
Velux windows to be fitted with double glazed units giving u value of better than 1.5W/sq.m K and to have double rafters to both sides, top & bottom
All new first floor bedrooms to have windows capable of being used as a means of escape ie; a minimum of 0.33sq.m, and at least 450mm wide & 750mm high clear opening with the cill between 800 & 1100mm above floor level
Windows to have min 1/20th floor area as opening lights and 1/10th floor area as glazed area to all habitable rooms.
VENTILATION
All habitable rooms to have 8000 sq. mm trickle ventilation plus an openable window or door equal to 1/20th of the floor area.
Kitchens to have background trickle ventilator of 4000 sq. mm plus an openable window and a mechanical extract fan capable of extracting 30 litres per second if a cooker hood or if a fan located elsewhere capable of extracting 60 litres per second.
Ventilation to an internal wc provided by an extract fan capable of extracting 6 litres per second operated intermittently and have an overrun of 15 minutes.
Air inlet provided by a 10mm gap under the door. Wc's with window to have opening of window equivalent to 1/20th floor area does not require mechanical extract.
Bathrooms and shower rooms to have background trickle ventilator of 4000 sq.mm and to be provided with an extract fan capable of extracting 15 litres per second and operated intermittently plus an openable window.
Utility Room to have trickle vent of 4000sq.mm and fan capable of extracting 30 litres per sec.
All extracts from fans to be connected via a pvc duct to outside air, terminating in an approved grille.

DRAINAGE
New 100mm drain system constructed in plastics.
Drain to be protected with 75mm concrete slab laid to the full width of the trench 150mm above the pipe where less than 600mm of cover.
All drains to be surrounded by pea gravel.
Concrete lintels provided to both leaves of external walls and internal wall where drains pass through. 50mm space all round drainpipe with masking both sides of 9mm Supalux board.
All drainage laid in accordance with BS.8301.

RAINWATER
All rainwater gutters, downpipes etc., to be black Upvc and to discharge via trapped access gullies to a suitably sized soakaway

PLUMBING
All new soil and vent pipes to be 100mm dia. Upvc fixed with wall brackets at 2.0M centres.
All bends in SVP to be so constructed as to have the largest possible radius of curvature and no change in cross section of the pipe throughout the bend.
New & Existing SVP to discharge to outside air via tile vent or similar approved terminal
Internal S & VP to be boxed in using 50 x 50 s.w. timber framing and 12.5mm plasterboard and skim.
All waste connections to S and VP's to be separated from the 100mm dia. WC. connection by 200mm measured vertically.
Sinks to have 40mm dia. Upvc branch pipes. Lavatory basins to have 32mm wastes up to 1.7 metre length,
increased to 40mm up to 3.0 metre lengths. 50mm wastes over 3.0m
Hot and cold water to all sinks & whb's
All earthing of pipework is to be concealed.
All sanitary fittings to be individually trapped with 75mm deep seal traps.
Stub vent pipes to be fitted with air admittance valve above the spillover level of the highest appliance connected to it.
The boxing to the stub pipe to have an air vent grille at high level.
Hot water to bath to be limited to 48degrees C by use of in line blending valve to comply with the requirements of BS EN1111:1999
Anti-syphon traps to BS 3943 into soil vent pipe or air attaining value as indicated. No branch to discharge into SVP lower than 450mm above invert of tail of the bend at the base of the stack.
Access plate to be provided at the base of each tack immediately above FFL min 200mm bend at the base.

ALL WATER INLETS AND DRAINAGE, AS WELL AS POSITIONS OF NEW OR RELOCATED MANHOLES TO BE AGREED WITH THE BUILDER ON SITE
SOAKAWAYS
Position on site to be agreed with L.A. inspector but must be a of 5M from any building and subject to the results of standard percolation test.
FALLS:Foul and Surface water drains to be laid at 1:60 min unless otherwise stated.
Foul water drainage runs and connections to be inspected and fully agreed by the Building Control prior to backfilling of trenches
New drains to be connected to mains sewerage system to have permission obtained by relevant statuary authority.
MANHOLES
For depths of over 900 mm to be constructed in Class B engineering brickwork, min wall thickness 225 mm, and flush pointed internally.
Base slab to be 150 mm thick concrete. Benching channel to be 30 degrees and topped with monolithic render (1:1 mortar).
Back filling to chamber should not be carried out until 48 hours after construction and hand packed with selected hard material.
Manholes deeper than 1.0 m to be fitted with iron steps set at 300 mm apart vertically and 200 mm apart horizontally.
Inspection chambers 900mm deep max to be Hepworth or similar 450mm dia polyproylene fitted in accordance with the manufacturers details and instructions
HEATING
to be extended small bore h.w. radiator system
Thermostatic control in ground floor hall space and thermostatic valves to all radiators
New floor areas to have underfloor heating system if required
Space and water heating also controlled using a manually adjustable timer

Heating system generally to comply with the requirements of BS5449:1990

Existing boiler to remain in existing position. Details to be found on site visit.
Hot water & heating systems Hot water & heating system to be sealed gas fired condensing combi boiler with automatic ignition with balanced flue - outlet to terminate externally through the external wall 300mm from any opening light. System to be designed & installed by a Capita gas safe registered heating engineer/contractor. All radiators are to be convector type with thermostatic valves. New boilers to have a SEDBUK rating of 88.
Rating & capacity of existing boiler to be checked for adequacy to ensure enough spare output to be capable of servicing new extension.

PART Q

SECURITY DOORS
All external doors and windows to be designed to meet security requirements of British Standard Publication PAS 24:2012 and letter plates to have max aperture of 260 x 40mm and to be located as per par 1.3 of Part Q.
Main doors to each dwelling to have door viewer, door chain or door limiter.

All door and window frames to be mechanically fixed to the structure in accordance with the manufacturers instructions.

WINDOWS
Windows to ground floor level, basement and easily accessible rooflights manufactured to meet the security requirements of British Standards publication PAS 24:2012, or designed and manufactured in accordance with Appendix B of Approved Document Q.

All door and window frames to be mechanically fixed to the structure in accordance with the manufacturers instructions.

PART R

INFRASTRUCTURE
In accordance with Part R of the Building Regulations, provide physical infrastructure (from the service providers access point to the occupiers network termination point) so that copper or fibre optic cables or wireless devices capable of delivering broadband speeds greater than 30mpbs can be installed.

ENERGY CONSERVATION
Low Energy at 40 lumens per circuit watt efficacy in accordance with L1 para 42 to be fitted to all rooms.

AUTOMATIC FIRE DETECTION
Automatic fire detection system to be installed in accordance with BS 5839 Part 6 2019. This system needs to be a minimum grade D (Mains powered with a battery back up and interlinked). In this instance it will require a category LD3 with smoke detectors in the hallway and landing with a heat detector in the kitchen.

Note: If ceiling mounted it is to be at least 300mm from any wall or light unit. If wall mounted it is to be fixed between 150 and 300mm below the ceiling. The smoke alarm is not to be located immediately above a stair shaft so that easy access is available to the unit and is to be located within 7 metres of a kitchen or living room or within 3 metres of a bedroom.

Electrician to supply commission certificate on completion.

SD Smoke detectors to be provided in positions shown.

CO Carbon Monoxide detector fitted in rooms with a boiler

HD Heat Detector fitted in kitchen

FD30 = Fire Door with 30 Minutes (minimum) integrity & rising butt hinges self closing

FD30s = 30 Minutes integrity fire door with self closing device and smoke stop and intumescent sealant

ELECTRICAL INSTALLATION
All new cable runs to be concealed, no surface wiring is to be used. Switches, sockets and other electrical equipment controls are to be positioned at a height usable by all i.e between a height of 450mm&1200mm above finished floor level in accordance with approved document M.
All work to comply with the latest edition of the IEE code. Contractor to allow for extending existing circuits as necessary.

Energy efficient bulbs & fittings to be provided in areas indicated thus (E) one number light fitting installed which will only take lamps having a luminous efficacy greater than 40 lumens per circuit-watt.
Any new external mounted light fitting are to be fitted with energy efficient Either a lamp not exceeding 150watts per fitting with automatic switch off when there is insufficient light and at night when light is not required or a light fitting with a socket that can only be used with bulbs having an efficiency greater than 40 lumens per circuit watt.

All electrical works to be carried out to meet the requirement of part P of the building regulations by a person competent to do so.
Prior to completion the local authority are to be provided with a copy of either:
An electrical installation certificate issued under a competent person scheme
or
An electrical installation certificates as defined in BS 7671 signed by a person competent to do so.

ELECTRICAL INSTALLATION AND POSITIONS OF SOCKETS AND LIGHTS TO BE DISCUSSED WITH BUILDER OR ELECTRICIAN

AN ELECTRICAL CERTIFICATE SHOULD BE OBTAINED BY THE CLIENT

BOILER RELOCATION
If boiler is relocated a Gas Certificate should be obtained by the client.

COMMISSIONING
Upon completion of the works the builder is required to issue to the building inspector a notice confirming that the fixed building services have been commissioned in accordance with a procedure approved by the secretary of state. A set of operating and maintenance instructions should be left for the occupier.

Technical Guidance Notes

All Dims in millimeters unless otherwise stated.
Do not scale except for planning purposes.
If in doubt - Ask

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Scale 1:25
1 0 2m

Scale 1:50
1 0 4m

Scale 1:100
2 0 5m

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