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PRODUCT LITERATURE
NEW RESTAURANT AT:

LAND AT COBDEN JUNCTION
GREATER LONDON HOUSE
HAMPSTEAD ROAD
LONDON
NW1 7QX

Document Reference: **1470-PL**

Date: 04/12/2015

REVISION: -

UNIT E3U BOUNDS GREEN INDUSTRIAL ESTATE RINGWAY LONDON N11 2UD TEL/FAX +44 (0)20 3232 4000
EMAIL info@vivendiarchitects.com
Registered in England & Wales No. 6864628 VAT Registration No. 832 2718 40

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BAUDER

UNIT E3U BOUNDS GREEN INDUSTRIAL ESTATE RINGWAY LONDON N11 2UD TEL/FAX +44 (0)20 3232 4000
EMAIL info@vivendiarchitects.com
Registered in England & Wales No. 6864628 VAT Registration No. 832 2718 40

CONDITION 5

BAUDER – SEDUM BLANKET GREEN ROOF

Green Roof Specification *(Document Reference: 1470-BG)*

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UNIT E3U BOUNDS GREEN INDUSTRIAL ESTATE RINGWAY LONDON N11 2UD TEL/FAX +44 (0)20 3232 4000
EMAIL info@vivendiarchitects.com
Registered in England & Wales No. 6864628 VAT Registration No. 832 2718 40

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Bauder Green Roof

Document Reference: 1470-BG

Specification for Bauder green roof.

To be read in conjunction with Building Regulations Document and other Bauder specification documents.

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EMAIL info@vivendiarchitects.com
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REF No: B150040 **PROJECT NAME: GLH – HAMPSTEAD ROAD**

NBS SECTION Q37 - DESCRIPTION OF WORKS

Section Q37 deals with the design and installation of the Bauder Green Roof landscaping system, including the various related elements i.e. separation, protection, and drainage layers, substrates, Bauder supplied planting and accessories such as inspection chambers, trims etc. It invokes clauses from related sections for waterproofing, insulation, landscaping and maintenance as necessary for a complete system.

It is intended for use on projects where the detailed design is completed by the specifier (architect or landscape architect) with technical assistance from the manufacturer as required and should be read in conjunction with any project specific drawings provided.

SCOPE OF WORKS

This section includes:

- Bauder Extensive green roof system components/ landscaping
- Related Bauder system accessories

This section does not include:

- Construction of the structural deck
- Bauder waterproofing system – refer NBS Section **J41-110B**

Q37 GREEN ROOFS
To be read with Preliminaries / General Conditions.

GENERAL

130 EXTENSIVE GREEN ROOF: Upper Roof.
- **Landscaping finish:** Pre-cultivated Sedum vegetation blanket
- **Substrate:** New Concrete Deck.
- **Slope:** 1°
- **Waterproofing system:** BAUDER TOTAL GREEN ROOF SYSTEM – as per J41-110B.
- **Drainage / protection layer:** Bauder SDF Mat - 20mm drainage / protection layer. Installation as clause 770B.
- **Vegetation blanket:** Bauder Xero Flor XF301 sedum blanket, applied in standard length rolls 2m x 1 m. Installation as clause 800B.
- **Landscaping depth:** ca. 48mm (excluding vegetation).
- **Vegetation:** Mainly Sedum with some moss and grasses.
- **Accessories: -**
- Bauder AL40 Sedum blanket edge trim, fitted to all perimeters. Installation as clause 820A.
- Bauder Xero Flor organic fertiliser, apply as clause 850A.
- **Additional requirements:** As clauses 210, 710, 715A, 720, 910, 915A, 916, 920, 930.

PERFORMANCE

210 GENERAL DESIGN
- **Green roof and associated features:** Complete the detailed design.
- **Proposals:** Submit drawings, technical information, calculations and manufacturers literature.

EXECUTION

710 INSTALLATION GENERALLY

- **Preparation:** Clear all surfaces of debris.
- **Timing:** After certification of waterproof membrane integrity.
- **Surface condition:** Visually inspect waterproof membrane, report any damage.
- **Faults in waterproof membrane:** Report.
- **Contamination**: Do not use materials detrimental to healthy plant growth.
- **Storage:** Do not overload.
- **Point loads:** Avoid.
- **Outlets:** Do not block.
- **Outlet grilles:** Installed (these can be omitted where Bauder inspection chambers are used, if the grille cap height obstructs the closing of the chamber lid).

715A GREEN ROOF RELATED REQUIREMENTS

- **The following are vital to the accurate pricing, correct installation, and ultimately the long-term life of a green roof, and must, therefore, be included within the specification and tender documents: -**
- **Loadings:** It is assumed that the architect or his advisors have satisfied themselves that the roof structure and deck are suitable to receive the dead load of the proposed green roof system and landscape both during construction and on completion of the works.
- **Additional protection:** A planned or contractual delay between the installation of the waterproofing and landscape will almost certainly necessitate additional/increased protection to the waterproofing. This protection may be temporary or permanent. The responsibility and cost of this possible extra protection should be clearly included within the tender documents.
- **Detailed drawings:** Correct detailing design and construction is essential to the long-term life of the green roof. It is essential, therefore, that detail drawings illustrating for the construction are included with the tender documents, in order to enable the contractor to tender accurately.
- **Minimum upstand height requirements**: The waterproofing should be taken up all abutment upstands, pipes, detailing protrusions etc. a minimum of 150mm above finished landscape surface level to comply with British Standards and current code of practice BS8217:2005.
- **Provision for living products in hot weather conditions:** During hot weather conditions, living products such as plants, turf, sedum blankets etc. must be laid on the day of delivery to site. With regard to sedum blankets or turf, any rolls not installed should be laid out and kept watered prior to final installation.
- **Watering / Irrigation:** Adequate provision for watering the installed any form of planting must be in place on site before the product is installed. Irrigation systems if fitted should be operational. Initial watering should be by surface sprinklers to water in the fertiliser, where this is specified. All watering should be carried out in strict accordance with the Bauder watering requirements and guidance document.
- **Final Inspection:** No landscaping work should be installed until Bauder have carried out a final inspection to the waterproofing and have passed this as suitable for guarantee. It is the responsibility of the roofing contractor to advise and organise this inspection with Bauder. We cannot guarantee any waterproofing that has been landscaped without this inspection having been carried out and passed as acceptable.
- **Damage risk form other trades:** No landscaping should be installed while the roof area is subject to other site traffic. Bauder will carry out an inspection of the completed roof 4-6 weeks following installation and any site related damage by others will be reported to the client. Bauder accept no responsibility whatsoever for damage to the product or the installation caused by site work carried out by others after the landscaping has been installed.

- **First year maintenance:** The contractor must price into his tender the cost of post installation maintenance for a minimum period of 1 year to ensure the handover of a flourishing green roof.

720 ADVERSE WEATHER

- **Unfinished work:** Secure from damage and wind uplift.
- **Conditions:** Do not install or work with frozen materials.

LANDSCAPING INSTALLATION

770B DRAINAGE LAYER INSTALLATION

- **Extent:** Continuous over designated roof area
- **Fitting:** Loose laid over the waterproofing and butt jointed with 100mm fleece overlap
- **Upstands:** Carefully cut to fit closely around penetrations and outlets.

800B VEGETATION BLANKET INSTALLATION

Handling blankets:

- **Timing:** Lay within 36 hours of lifting from growing position.
- **Method:** laid manually – two-man operation
- **Excessive stacking:** Not permitted.
- **Material loss (maximum):** 3% of total surface area.

Growing medium condition: Thoroughly watered

Laying blankets:

Dry, damaged, frosty or waterlogged blankets: Do not lay.

- **Orientation:** Diagonal or perpendicular to slope of roof.
- **Joints:** Stagger. Butt together or slightly overlap to prevent gaps. Do not stretch blankets. All excess vegetation should be removed from the overlap and the opposite leading edge of the blanket to ensure that the joints butt together tightly (as per the Bauder installation guideline).
- **Edges:** Finish with whole blankets.
- **Consolidation:** N/A
- **Dressing:** Bauder Xero Flor substrate.
- **Application:** Brush in to fill joints.
- **Watering:** Thoroughly water using surface sprinklers immediately after installation and substrate dressing, ensuring that the blankets and substrate are fully saturated before moving on to the next area.
- **Roll size:** 2m x 1m

820A EDGE RETAINING PROFILE INSTALLATION

- **Cutting:** Neat, accurate and without spalling.
- **Junctions:** Use connector pieces and pre-formed 90º corners where required.
- **Position:** True to line and level. Smooth continuous lines.
- **Fixing:** The AL40 Sedum blanket edge trim is to be secured in place by separate pieces of torch applied Bauder Plant-E capping sheet cut into strips 500mm x 200mm, these bituminous flashings should be torched through the holes in the trim to the waterproofing surface and set at intervals of 400mm between each flashing piece, bonding onto the main capping sheet by a minimum 100mm.
- **Location:** To secure and contain the exposed edges of XF301 sedum blanket at abutments and open perimeters.
- **Precautionary note:** When cutting metal, please ensure that appropriate tools and personal protection equipment are used.

850A FERTILISER

- Bauder Organic Fertiliser slow release must be applied at a rate of 80g/m² onto the installed

planting.

- This product is to be supplied by Bauder Ltd.
- Care must be taken to distribute the fertiliser evenly, through use of an approved applicator.
- The vegetation / vegetation blankets should then be thoroughly saturated by the use of sprinklers so as to promote rapid establishment. It is the responsibility of the roofing contractor to liaise with the main contractor/ building owner to provide water to ensure that the growing medium/ blanket does not dry out within the first month – refer document 'Watering Requirement Guidelines for Extensive and Bio-diverse green roof installations'.

COMPLETION

910 INSPECTION

- **Timing:** Before handover.
- **Give notice (minimum):** 3 days.

915A ESTABLISHMENT WATERING REQUIREMENTS –

- XF301 requires surface watering for the first 4 weeks following installation (to ensure that the sedum blanket remains moist to the touch) It is the responsibility of the roofing contractor to liaise with the main contractor/ building owner to provide water to ensure that the vegetation mat does not dry out during this period.
- An adequate mains supply of sufficient pressure must be available and operational prior to the sedum blanket being delivered and installed. Irrigation systems (where fitted on roof slopes above 10 degrees) must be operational, but initial watering in of the fertiliser must be by surface mounted sprinklers.
- See the Bauder Watering Guide document for detailed information on watering requirements.
- Bauder Ltd accepts no responsibilities whatsoever for the condition of installed sedum blankets that are not properly watered in accordance with our recommendations.

916 POST INSTALLATION MAINTENANCE

- The installing contractor should price into the tender, the cost of carrying out post-installation maintenance for a contract period to be agreed with the client's representative. Following completion of the landscaping installation and handover, the responsibility for future on-going maintenance of the green roof planting becomes the responsibility of the building owner or the Main Contractor, where this element forms part of the contract.
- **Maintenance services:** Bauder Ltd offers a professional maintenance service using experienced green roof technicians and would be pleased to provide an estimate for carrying out on-going maintenance. Please contact our green roof maintenance team on Tel: 01473 257671. Alternatively, the work can be contracted to experienced landscape contractors of your choice.
- **Period of maintenance contract:** *Insert requirement i.e. one year, two years etc.*
- **Scope of maintenance procedure:** as per manufacturer's recommendations.

920 COMPLETION

- **General:** Leave the works in a clean, tidy condition.
- **Surfaces:** Clean immediately before handover.
- **Outlets:** Clean and clear of obstructions.
- **Completed green roof:** Protect from adjacent or high level working.

930 DOCUMENTATION

- **Timing:** Submit at handover.
- **Contents:**
- Manufacturer's guarantees and warranties.

- Procedures for maintenance of the green roof.
- Record drawings showing the location of planting and associated features.
- **Number of copies:** as required by client.

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Bauder Waterproofing

Document Reference: 1470-BW

Specification for Bauder waterproofing.

To be read in conjunction with Building Regulations Document and other Bauder specification documents.

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EMAIL info@vivendiarchitects.com
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REF No: B150040 **PROJECT NAME: GLH – HAMPSTEAD ROAD**

NBS SECTION J41 - DESCRIPTION OF WORKS

Section J41 deals with the installation of the Bauder Waterproofing System, comprising coverings of multiple layers of reinforced bituminous membranes laid and jointed using self-adhesive and/or torch application as required. It includes where required, the vapour control layer, thermal insulation, underlayer and capping sheet membranes (root resistant for green roof systems) and presumes the deck substrate and roof falls as stated within the specification below. Accessories are included where relevant.

It is intended for use on projects where the detailed design is completed by the specifier (architect or landscape architect) with technical assistance from the manufacturer as required and should be read in conjunction with any project specific drawings provided.

SCOPE OF WORKS

This section includes:

- The Bauder waterproofing system.
- Related Bauder system accessories
- Thermal insulation that meets the required U Value.
- Internal rainwater outlets (but not the connected drainage/plumbing goods)
- Surfacing (paving on support pads)

This section does not include:

- Construction of the structural deck.
- Proprietary rainwater drainage / plumbing – refer NBS section R10
- Lightning protection – refer NBS Engineering Services, Section W60.
- Green Roof landscaping – refer section Q37

J41 REINFORCED BITUMEN MEMBRANE ROOF COVERINGS
To be read with Preliminaries/ General Conditions.

TYPES OF COVERING

110A BUILT-UP REINFORCED BITUMEN MEMBRANE WARM DECK ROOF COVERING

- **Roof area:** Terrace.
- **Substrate:** New Concrete deck (designed and constructed level with no deflections, hollows or back-falls). Roof falls to be provided by the tapered insulation scheme.
  - **Preparation:** As clause 610B.
- **Vapour control layer:** Bauder VB4-Expal, 4 mm thick aluminium lined, elastomeric bitumen torch applied vapour barrier.
- Installation as clauses 670D, 710.
- **Insulation:** BauderPIR Tapered insulation, highly efficient rigid urethane insulation. Installation in accordance with the Bauder scheme supplied to achieve the required U value (refer Clause 230). This product is fire resistant, has a zero ODP and a Green guide rating of 'A'. Installation as clause 680G.
- **Insulation to upstands:** N/A.
- **Waterproof covering:** BAUDER TOTAL ROOF SYSTEM.
  - **System manufacturer:** Bauder Limited, 70, Landseer Road, Ipswich, Suffolk, IP3 0DH.

Tel: 01473 257 671. Fax: 01473 230 761. **Email:** technical@bauder.co.uk
Web: www.bauder.co.uk

- **Underlayer:** BauderTEC KSA DUO, 3 mm thick, 200g/m² glass-fibre reinforced, elastomeric self-adhesive bitumen underlayer.
  Attachment: As clauses 710, 747A.
- **Top layer / Cap sheet:** Bauder K5K, 5 mm thick, 250g/m² polyester reinforced, elastomeric bitumen torch applied capping sheet, charcoal grey finish.
  Attachment: As clauses 710, 750A.
- **Flashings and detail work:** Bauder K5K capping sheet, charcoal grey finish. Install as clauses, 773, 774, 775.

- **Surface protection:**
  Support pedestals for paving: Bauder pedestal support system, as clause 835A.
  Concrete paving slabs: Supplied by others to the landscape designers requirements) as clause 465. Concrete paving slabs to be installed on to the specified proprietary paving pedestal support system, as clause 840A.
- **Accessories: -**
  - Bauder 50 mm x 50 mm PIR angle fillets. Installation, as clause 775.
  - Bauder GRP termination bar. Installation as clause 781B.
- **Additional Requirements:** 210, 230, 515, 520, 530, 560, 561, 562, 910, 940, 950B.

110B BUILT-UP REINFORCED BITUMEN MEMBRANE WARM DECK ROOF COVERING

- **Roof area:** Upper Roof.
- **Substrate:** New Concrete deck (designed and constructed level with no deflections, hollows or back-falls). Roof falls to be provided by the tapered insulation scheme.
  - **Preparation:** As clause 610B.
- **Vapour control layer:** Bauder VB4-Expal, 4 mm thick aluminium lined, elastomeric bitumen torch applied vapour barrier.
- Installation as clauses 670D, 710.
- **Insulation:** BauderPIR Tapered insulation, highly efficient rigid urethane insulation. Installation in accordance with the Bauder scheme supplied to achieve the required U value (refer Clause 230). This product is fire resistant, has a zero ODP and a Green guide rating of 'A'. Installation as clause 680G.
- **Insulation to upstands:** BauderPIR flat board 160mm thick, to be used at all vertical abutments to roof openings such as rooflight or plant kerbs i.e. builders kerbs (but excluding proprietary insulated integrated rooflight units), in compliance with Part L of the current building regulations. Installation as clause 681C.
- **Vertical upstands to insulated cavity wall abutments only:** 30 mm thick, Bauder PIR flat board, fire resistant, zero ODP, highly efficient rigid urethane insulation. In compliance with Part L of the current Building Regulations, the insulation to wall abutments should be 300 mm in height from the deck surface to the top of the upstand, with the vertical insulation being installed before the flat, so as to retain the insulation at the base. Installation as clause 681C.
- **Waterproof covering:** BAUDER TOTAL GREEN ROOF SYSTEM.
  - **System manufacturer:** Bauder Limited, 70, Landseer Road, Ipswich, Suffolk, IP3 0DH.
    Tel: 01473 257 671. Fax: 01473 230 761. **Email:** technical@bauder.co.uk
    Web: www.bauder.co.uk
  - **Underlayer:** BauderTEC KSA DUO, 3 mm thick, 200g/m² glass-fibre reinforced, elastomeric self-adhesive bitumen underlayer.
    Attachment: As clauses 710, 747A.
  - **Top layer / Cap sheet:** Bauder Plant-E, 5 mm thick, 250g/m² polyester reinforced, elastomeric bitumen root resistant, torch applied capping sheet, green slate finish.
    Attachment: As clauses 710, 750B.
  - **Flashings and detail work:** Bauder K5K capping sheet, charcoal grey finish. Install as clauses, 773, 774, 775.

- **Surface protection:** Extensive green roof landscaping - refer Section Q37-130.
- **Accessories: -**
  - Bauder Insulation upstand support brackets. Installation, as clause 775A.
  - Bauder 50 mm x 50 mm PIR angle fillets. Installation, as clause 775A.
  - Supply and install new Bauder Bituminous Compact Insulated Vertical rainwater outlets, quantity as required, 100 mm nominal bore, complete with pre-attached bitumen connection flange and dome grating. The appropriate depth extension unit (supplied separately) must be used when this outlet is used within warm roof construction. Installation as clause 784A.
- **Additional Requirements:** 210, 230, 515, 520, 530, 560, 561, 562, 910, 940, 950B.

PERFORMANCE

210 ROOF PERFORMANCE
- **General:** Secure, free draining and weather tight.

230 INSULATION
- **Thermal transmittance of roof (U-Value):** Terrace - 0.15 W/m²K
  Upper Roof - 0.15 W/m²K
- **Finished Surface:** Suitably even, stable and robust to receive roof covering.
- **Insulation compliance:** To relevant British Standard or Agrément certified.

PRODUCTS

320 PRIMER
- **Type:** Any commercially available Bituminous Priming Solution meeting characteristics of BS 8217, clause 5.6.2. supplied by approved installer, or Bitumen cut back with volatile solvent.
- **Characteristics when tested to BS EN 13357:**
  - **Volatile solvent content (minimum):** 40% by mass.
  - **Viscosity (maximum) (STV at 25°C, 4 mm orifice):** 10s.

331 PREFORMED METAL HARD EDGE INSULATION PROTECTION ANGLES
- **Material:** Galvanised mild steel
- **Thickness:** 1mm
- **Dimensions:** 50 mm x 50 mm
- **Length:** 3 m max.

470 PAVING TILES
- **Type: _____.**
- **Manufacturer: _____.**
- **Product reference: _____.**
- **Colour/ Finish: _____.**
- **Size: _____.**

EXECUTION GENERALLY

515 ADVERSE WEATHER
- **General:** Do not lay coverings in high winds, wet or damp conditions or in extremes of temperature unless effective temporary cover is provided over working area.

- **Unfinished areas of roof:** Keep dry, protect edges of laid membrane from wind action.

520 INCOMPLETE WORK

- **End of working day:** Provide temporary seal to prevent water infiltration.
- **On resumption of work:** Cut away tail of membrane from completed area and remove from roof.

530 APPLYING PRIMERS

- **Coverage per coat (minimum):** As per manufacturer's recommendations.
- **Surface coverage:** Even and full.
- **Coats:** Fully bond. Allow volatiles to dry off thoroughly between coats.

560 GENERAL WORKMANSHIP REQUIREMENTS

- Installation of the Bauder waterproofing system may only be carried out by trained and certified operatives approved by Bauder Ltd and who carry current ID badges. These should be available for inspection at all times.
- Workmanship must comply with Codes of Practice BS 8217:2005 (or alternatively Bauder Ltd.'s specification where otherwise stated). Non-compliant workmanship will not be permitted, even if the system is watertight. The client will be told that all such faults must be remedied, before the Guarantee is issued.
- All waterproofing materials and system components must be supplied by Bauder Ltd, unless otherwise stated. Any sub-standard materials or un-authorised alternatives will be rejected. Any building work which is the responsibility of the roofing contractor and has a bearing on the life of the Bauder System must be carried out by properly trained and qualified tradesmen.
- Any structural damage, peculiarities or details discovered that might affect the performance of the Bauder system, should be reported immediately to the client's representative and Bauder Limited in order that they may assist in overcoming the problem.
- The contractor is to ensure water tightness of the roof at all times. Proper day joints must be formed at the end of each working day to provide a temporary seal. No mopping or loose covers will be permitted.
- Where building works are to be carried out by other trades, following completion of the waterproofing, the contractor must make adequate provision for supplying protection to prevent damage to the new membranes. The final inspection will not be carried out by the Bauder Site Technician or the Bauder nominated Independent surveyor until all associated trades are complete and the roof areas are clear from all debris and protection layers.
- It is imperative that the Bauder Approved Contractor conforms to the workmanship criteria as listed above. Any deviation will result in the contract being considered unguaranteeable.
- All mechanical and electrical work to plant and equipment should be carried out by competent mechanical and electrical qualified tradesmen. All plant is to be reinstated and re-commissioned on completion of the roofing works in accordance with the client's detailed specification.
- Where building works are to be carried out by other trades, following completion of the waterproofing, the contractor must make adequate provision for supplying protection to prevent damage to the new waterproofing.
- If any items of plant/equipment are to be situated on the finished roof, a sacrificial layer of Bauder capping sheet is to be loose laid beneath. This is to extend a minimum 25mm past the point of contact on all sides. In the case of heavy items it may be necessary to introduce a load-spreading slab, please contact Bauder for further advice.
- All lead work to be carried out by skilled tradesmen and in accordance with current codes of practice and the recommendations of the Lead Development Association.

561 SITE INSPECTIONS

- Bauder Site Technicians will carry out regular inspections of the project during the course of the works. The Approved Contractor must give reasonable notice to Bauder of their intention to commence laying capping sheet. This will allow a discretionary inspection of the underlayer to take place, so that any remedial treatment necessary can be carried out prior to installing the capping sheet. This is particularly important when tapered insulation has been used to ensure that any areas of standing water that may remain can be addressed.
- Bauder must be notified when the roof is ready for final inspection and all related works and snagging complete. See also clauses 910 (Landscaped roofs).

562 HEALTH & SAFETY INFORMATION – ROOFING WORK

1. Suitable precautions must be taken to prevent accidents occurring when roofing systems are being installed.

2. The contractor must ensure that adequate measures are taken to effectively prevent injury to members of the public and other persons using the premises.

3. Where microwave equipment is installed at roof level, care must be taken to prevent persons working on the roof from being exposed to large doses of microwave radiation.

4. The contractor is responsible for providing adequate fire fighting equipment in the form of extinguishers during work on the roof. These should be kept in easily accessible locations and be suitably signed.

5. As far as roofs are concerned, edge protection in the form of scaffolding or a fixed structure should be in place to a height of 1.1 metres in accordance with the Workplace (Health, Safety and Welfare) Regulations 1992.

   Failing this, safety harnesses may be worn in exceptional circumstances where this is the only way of preventing falls.

   Means of access should be by fixed ladder, passenger hoist or scaffolding.

6. The contractor must ensure that suitable written method statements and risk assessments are available for the work being undertaken. In particular, it is essential that manual handling methods be fully assessed as roofing materials are heavy and can cause serious injury.

7. The contractor must ensure that suitable information about the roof covering is provided to the Client at the end of the work to ensure that work in future can be carried out safely. This information will form part of the Safety File.

8. All persons working on the roof should be provided with, and wear, suitable personal protective equipment and wet weather gear. Training must be provided to all contract staff on the safe use of the equipment.

9. The installer must observe Product Safety Datasheets, relevant to the materials being used.

10. Current CDM Regulations, must be observed.

SUBSTRATES / VAPOUR CONTROL LAYERS / WARM ROOF INSULATION

610B SUITABILITY OF SUBSTRATES (CONCRETE)

- **Substrates generally:** Secure, clean, dry, smooth, and free from frost, contaminants, voids and protrusions.
- **Falls:** Where provided, the falls/cross-falls should be designed to 1:40 to achieve minimum finished falls of 1:80 to comply with drainage requirements of BS 6229:2003 and current codes of practice BS 8217:2005. No deflections or back-falls present if the deck is designed to achieve a 0° level finished surface.
- **Preliminary work:** Complete including:
  - Grouting of deck slab joints, application of surface screed (including falls if specified).
  - Formation of abutment upstands, kerbs, box gutters, sumps, grooves, chases and expansion joints.
  - Fixing of battens, fillets and anchoring plugs/strips as required.
- **Moisture content and stability of substrate:** Must not impair roof integrity.
- **Preparation:** The new concrete/ screed deck to be allowed to cure thoroughly, remove rough edges, and surface defects. If the surface is very rough a skin screed of concrete to be applied to give a smooth surface.
- Prime all areas receiving the new waterproofing with bitumen primer, as clause 320, and allow it to dry.

641 INSTALLING PREFORMED METAL HARD EDGE INSULATION PROTECTION ANGLES

- **Location:** Use to provide hard edge protection at all internal gutter channels on warm roofs where the insulation from the flat area steps down to meet the insulation in the gutter sole.
- **Preparation:** Surface to be inspected and cleaned if necessary using white spirit to remove any contaminants, dirt or dust or alternatively primed with bituminous primer. Prepared material to be thoroughly dry before use
- **Installation:** The 50 x 50 mm galvanised mild steel angle to be adhered to the exposed leading edge of the insulation using a small thin intermittent line of Bauder Polyurethane membrane adhesive along the upper surface/edge. The purpose being to retain the metal in position to prevent any post-installation movement.

670D LAYING VAPOUR CONTROL LAYER

- **Attachment:** Generally, fully bonded to deck substrate in accordance with manufacturer's requirements. However, for new concrete, the vapour barrier should be partially bonded (in the approved Bauder manner) to meet the requirements of the current codes of practice.
- **Side and end laps:** minimum 100 mm, with all laps torch sealed to provide a 5-10 mm bitumen bead extrusion. Installation methods as recommended by manufacturer.
- **Penetrations:** Fully seal using bonding methods recommended by manufacturer.
- **Edges of insulation at roof edges, abutments, upstands, kerbs, penetrations and the like:** Enclose, with vapour control layer:
  - Dressed up 150 mm above surface of insulation, thus providing 100 mm (minimum) seal when overlapped by the roof covering.

680G LAYING WARM ROOF INSULATION

- **Setting out:** Laid strictly in accordance with the manufacturers scheme plan and installation instructions. Bauder cannot be held responsible for the drainage performance of tapered insulation schemes applied to an inappropriate deck surface and it is the responsibility of the installing contractor to check the roof deck surface and report any discrepancies.
  - **Long edges:** Fully supported (if metal deck - run at right angles to metal deck troughs)
  - **End edges:** Fully supported.
  - **Joints:** close butted together.
  - **End joints:** Stagger.
- **Thermal performance:** Refer to Bauder Tapered Insulation Layout Plan for details of 'U' value achieved by this scheme.

- **Before installing:** No tapered boards should be laid on site without a copy of the latest scheme to hand. Contractors should always refer to the Bauder plan with regard to the recommended start point and layout of boards. If contractors are unsure of the correct plan being on site they should check with the Bauder Technical Department ASAP.
- **Wastage:** All off-cuts over 300mm must be considered as usable and are included as such within the scheme plan.
- **Bedding:** Bonded to the upper surface of the Vapour barrier using Bauder Polyurethane Insulation Adhesive. The adhesive should be applied in strips following the direction of the board length giving 6 no. 8 mm wide continuous and equally spaced adhesive beads within each 600 mm board width.
- **Protection to exposed edges of insulation:** Reduced thickness treated timber batten as clause 640 (or equivalent plywood construction), a minimum width of 150 mm and 10 mm less in thickness than the insulation to accommodate the build-up of the waterproofing layers – all securely fixed to the deck. Outer edges chamfered at changes in level.
- **Completion:** Boards must be in good condition, well-fitting and stable.

681C INSTALLING WARM ROOF INSULATION (INSULATED UPSTANDS)

- **Bedding:** Bonded to the upper surface of the Vapour barrier using Bauder Polyurethane Insulation Adhesive. The adhesive should be applied in strips following the direction of the board length giving 4 no. 8 mm wide continuous and equally spaced adhesive beads within each 600 mm board width. Upstand insulation boards should be installed before the insulation to the flat areas so that the vertical upstand insulation is retained both at the base and at the top. At vertical wall abutments that are cavity insulated, retention is obtained by mechanical fixing of the Bauder insulation support bracket. Where the use of hot bitumen is considered unsafe or impractical for access reasons, it is permissible to use Bauder insulation adhesive as an alternative, following the guidance/installation instructions on the container.
- **Protective hard edges:** treated timber battens or Bauder Insulated upstand brackets (as appropriate to given detail situation) must be used at all right angled edges e.g. top edges of parapet walls or abutment upstands.
- **Encapsulation seal:** Provision must be allowed for forming a minimum 100 mm lap seal between the vapour control layer and underlayer, where the insulation finishes.

WATERPROOF COVERINGS/ ACCESSORIES

710 LAYING REINFORCED BITUMEN MEMBRANES GENERALLY

- **Direction of laying:** Unrolled up the slope.
  - Where practicable, install so that water drains over and not into laps.
- **Side and end laps (minimum):** 100 mm, with the exception of mineral surfaced membranes, where side laps are 80 mm, but the head laps to remain 100 mm.
- **Head and side laps:** Offset.
- **Intermediate and top layer/Capping sheet:** Fully bond.
- **Successive layers:** Apply without delay. Do not trap moisture.
- **Strips of bitumen membrane for 'linear' details:** Cut from length of roll e.g. gutter sole pieces.
- **Detail flashings:** to be cut from width of roll.
- **Completed coverings:** Firmly attached, fully sealed, smooth, weather proof and free draining.

747A SELF-ADHESIVE BONDING OF REINFORCED BITUMEN UNDERLAYER

- **Bond:** Full over whole surface, with no air pockets.
- **Underlayer:** Cold applied and fully bonded by removing the release foil sheet and installing in the approved Bauder manner, using the Bauder long handled roller to extrude a 5-10 mm bead of bitumen. Head laps to be 100 mm side laps to be 80 mm, lapping red strip over blue and

torch sealing. All laps to upstands, edge details, flashings, etc., to be 100 mm. The underlayer must be taken up all upstands, edge details, in accordance with current British Standards and the manufacturer's recommendations.

- **Alternative underlayer for detail work:** For detailing to un-insulated abutment upstands, where the waterproofing is to be applied to rough or uneven non-combustible surfaces i.e. brickwork or concrete, it is permissible for the installing contractor to use the Bauder underlayer appropriate to the specified system where this product is considered to be better for application to these surfaces. For all other situations, and particularly to vertical insulation, the Bauder Self-Adhesive Underlayer appropriate to the specified system must be used.
- **Underlayer inspection:** The Approved Contractor must give reasonable notice to the nominated Bauder Site Technician of their intention to commence laying capping sheet. This will allow a discretionary inspection of the underlayer to take place, so that any remedial treatment necessary can be carried out prior to installing the capping sheet.

750A LAYING MINERAL FACED REINFORCED BITUMEN TORCH-ON CAPPING SHEET

- **Bond:** Full over whole surface, with no air pockets.
- **Excess compound at laps of top layer/ capping sheet:** Leave as a 5 mm - 10 mm continuous bitumen bead extrusion.
- **Laying top layer:** Fully bonded to the underlayer by torching in the approved Bauder manner. Head laps to be 100 mm, side laps to be 80 mm. All laps to upstands, edge details, flashings, etc. to be 100 mm.
- **Final Inspection:** The finished roof must be thoroughly inspected by the Bauder Site Technician. This is to ensure that any remedial treatment that is necessary can be carried out prior to issuing the guarantee. Failure to ensure the instigation of this inspection will result in the issuing of the Bauder guarantee being put in jeopardy.

750B LAYING REINFORCED BITUMEN TORCH-ON CAPPING SHEET

- **Bond:** Full over whole surface, with no air pockets.
- **Excess compound at laps of top layer/ capping sheet:** Leave as a 5 mm - 10 mm continuous bitumen bead extrusion.
- **Laying top layer:** Fully bonded to the underlayer by torching in the approved Bauder manner. Head laps to be 100 mm, side laps to be 80 mm. All laps to upstands, edge details, flashings, etc. to be 100 mm.
- **Final Inspection:** No landscaping is to be applied until the root resistant capping sheet has been thoroughly inspected by the Bauder Site Technician. This is to ensure that any remedial treatment that is necessary can be carried out prior to laying the landscaping elements. Failure to ensure the instigation of this inspection will result in the issuing of the Bauder guarantee being put in jeopardy.

FLASHINGS AND DETAIL WORK

773 FIRE RISK DETAILING - ALTERNATIVE MEMBRANES AND APPLICATION

- For detailing application in areas constructed from or adjacent to potentially flammable materials, such as timber, plywood OSB/3 etc. or where considered appropriate to minimise fire risk.
- **Primers:** Bauder SA Bonding Primer must be used when using Bauder self-adhesive membranes and a torch-free application is required.
- **Underlayers:** it is permissible to use a Bauder self-adhesive membrane so long as this product is a recognised component of the system specified.
- Acceptable alternatives underlayers are listed below: -

- **Bauder G4E** to be replaced with **Bauder KSA Duo**
- **Bauder EGV 3.5** to be replaced with **Bauder Sprint Duo**

- A list of permissible hot air detailing tools are shown below:

Hot air welding equipment

The equipment required to install the membranes must be manufactured by either **Leister** (contact Welwyn Tool Group, Tel 01707 331 111, http://www.welwyntoolgroup.co.uk) or **Sievert** (contact Lister Gas Pro, Tel 0800 801 046, ch300@lister.co.uk) and is available for hire or purchase.

Equipment details

LEISTER

Side laps – one of the following:-

- **Leister Varimat or Bitumat** automatic hot air welder 240V/4600W with an 80mm nozzle.
- **Leister Electron** hot air hand tool 240V/4500W with an 80mm nozzle.

Head laps and all detailing

- **Leister Electron** hot air hand tool 240V/4500W with an 80mm nozzle.

SIEVERT

Side laps – one of the following:-

- **Sievert TW5000** automatic hot air welder 240V/5000W with an 80mm nozzle.
- **Sievert TH1750** hot air hand tool 240V/2300W with an 80mm nozzle.

Head laps and all detailing

- **Sievert TH1750** hot air hand tool 240V/2300W with an 80mm nozzle.

774 **Capping sheets:** where appropriate, the installing contractor should use Bauder KSO SN capping sheet, applied to the Bauder self-adhesive/hot air applied underlayer using hot air hand tools suitable for use with bituminous systems. Please note that Bauder KSO SN is only available in one colour - natural slate.

775 SKIRTINGS AND UPSTANDS

- **Angle fillets:** Bauder PIR angle Fillets (50 mm x 50 mm) must be used at all right angled upstands, provisionally bonded in Bauder PUR membrane adhesive and subsequently retained once the underlay detailing is applied. Under no circumstances must fillets of an alternative material be incorporated (i.e. cork, fibre, etc.) as this would invalidate the guarantee.
- **Layers of bitumen membrane:** Carry in staggered formation up the upstand, with each layer fully bonded.
- **Upstands:**
- **At ends of rolls:** Underlay layer only, form with bitumen membrane carried up without using separate strip.
- **Elsewhere:** Form with matching strips of bitumen membrane, maintaining laps.
- **Additional fixing of bitumen membranes:** Mechanically fix the top leading edge of all upstand details in excess of 250 mm in height using appropriate fasteners. In the event of doubt, Bauder should be consulted regarding any specific requirement.
- **Upstand details (minimum height):** 150 mm. This must be taken from the finished roof surface. Please note that for landscaped roofs, this minimum height is measured from the finished landscape surface as opposed to the waterproofing surface. Special attention should be paid to all structures, such as rooflights, counter-flashings, window and door cills, pipes etc. Bauder cannot take responsibility for water ingress over waterproofing details constructed below the recommended minimum height.
- **Flashings:** Separate flashings must always be formed. Capping sheet taken up the upstand in one piece will not be permitted.

REF No: B150040 **PROJECT NAME: GLH – HAMPSTEAD ROAD**

775A SKIRTINGS AND UPSTANDS

- **Insulated upstand brackets:** Bauder insulated upstand support brackets must be used at all vertical abutment wall upstands (where the wall cavity is insulated) in conjunction with 30 mm Bauder insulation. These are to be fixed at 400mm centres using suitable fixings through the vapour barrier, so that the top edge is a minimum of 300mm above the surface of the deck. A 3mm gap should be left between adjacent sections. The detail is to be carried out in accordance with the Bauder detail drawing, where provided.
- **Angle fillets:** Bauder PIR angle Fillets (50 mm x 50 mm) must be used at all right angled upstands, provisionally bonded in Bauder PUR membrane adhesive and subsequently retained once the underlay detailing is applied. Under no circumstances must fillets of an alternative material be incorporated (i.e. cork, fibre, etc.) as this would invalidate the guarantee.
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- **Flashings:** Separate flashings must always be formed. Capping sheet taken up the upstand in one piece will not be permitted.

781B GRP TERMINATION BAR

- **Type:** Bauder GRP termination bar strip, to be installed above the dressed waterproofing.
- **Fixing:** fixed above (and not through) the completed upstand waterproofing. The termination bar is to be correctly positioned and all holes marked and drilled. The contact area of the upstand and the reverse side of the termination bar is then cleaned and primed with **Bauder sealant primer** and allowed to dry**.** Install with 2 No. beads of **Bauder sealant** to rear surface of bar, plugged and screw fixed at 300mm centres.
  Upstands exceeding 250 mm: In accordance with current Codes of Practice, upstands exceeding 250 mm in height are classed as vertical work and should be mechanically fixed along the top leading edge of the waterproofing (screws and plates or flat bar fixed).
- **Sealant: Bauder sealant primer** and **Bauder sealant** should then be applied to the protruding top lip and finished neatly with the correct tooling. Please note that the termination bar should provide a minimum cover of 30mm over the top of the finished upstand waterproofing.

784A ROOF DRAINAGE OUTLETS

- **Product name:** Bauder Bituminous Compact Insulated Vertical Outlet
- **Material:** Cast polyurethane body with integral bituminous connection flange.
- **Product size/ reference:** 100 mm nominal bore, with vertical spigot designed to connect to standard 110mm pipework (ref Part Nr. GB60262100).
- **Flow rate:** 6.1 litres/sec. (Based upon vertical pipework and a 35 mm head of water pressure – according to BS EN 1206:3:2000).
- **Pipe connection:** Bauder Compact Insulated Vertical Outlets are suitable for connection to:
  - uPVC “O” ring socketed soil grade pipe to BS 4514: 1983

  - Socketed and socket-less cast iron pipework to BS 416:1973 and EN 887. Socketed pipework will require cold caulking or PVC to cast iron adaptors. Socket-less pipework can be connection using an appropriate SML mechanical coupling.
  - HDPE pipework with appropriate SML mechanical coupling
- **Type of grate/ fittings:** supplied with a tough polyamide leaf guard.
- **Insulation Extension - Warm roofs only:** When the outlet is used as part of a warm roof build-up and the insulation thickness exceeds 60 mm, an additional extension component must be used. The Bauder Compact Extension Unit is available in two sizes:
  - 60mm -150 mm (ref. Part Nr. GB60263060)
  - 120mm - 220 mm (ref. Part Nr. GB60263120)

  The extension unit must be mechanically fixed through the PUR rim to the structural deck.
- **Installation requirements:** These outlets are components that form part of the Bauder waterproofing system and for guarantee reasons, should only be installed by Bauder Approved installers. Connectivity to below deck drainage pipework to be the responsibility of the plumbing contractor.
- **Fixing:** The outlet is to be secured through the rim to the structural deck by a minimum of four fasteners appropriate to obtain an adequate attachment to the deck substrate material. Some deck structures require preparatory works before the outlets can be installed: -
  - **Concrete decks** – the opening for the outlet to be either pre-cast or core-drilled so that the outlet can be installed at the same time as the vapour barrier layer. Provision for a 250 mm dia. opening is required.
  - **Profiled metal decks** – these also require a 250 mm dia. Opening cut into the decking, but in addition will require a 600 x 600 x 1.25 mm galvanised steel reinforcing plate secured to the deck before the outlet can be installed. This item has a pre-cut 250 mm dia. hole and is available from Bauder as accessory item, ref: Part Nr. GB60266250.
  - For detailed information, refer to the manufacturers installation guidelines.

SURFACING

835A ADJUSTABLE PEDESTAL SUPPORTS

- **Product ref:** Bauder Pedestal Support System
- **Material:** Polypropylene copolymer with min. 65% recycled content.
- **Colour:** Black
- **Placement - Supports to be installed according to the Bauder System build-up below: -**
  - **Bituminous membranes:** directly on to the waterproofing.
  - **Inverted insulation:** directly on to filter layer / vapour permeable membrane.
  - **Thermofol Single Ply Membrane:** directly on to Bauder protection fleece.
  - **Thermoplan Single Ply membrane:** directly on to membrane surface.
  - **LiquiTEC liquid cold applied system:** directly on to waterproofing surface.
- **Range of adjustment:** 17 mm - 850 mm (bracing system used on heights over 600 mm).
- **Head support (surface area):** 190 cm².
- **Base Support (surface area):** 315 cm².
- **Spacers/ shims:** range available.
- **Spacer tabs:** Available to provide drainage gaps of 2mm, 4.5 mm, 6 mm, 8 mm and 10 mm.
- **Slope compensation:** 0% - 5% @ half degree increments.
- **Compressive strength:** Maximum 1000 kg.
- **Installation:** Please refer to the manufacturer's technical literature and guidelines.
- **Extenders:** Additional height adjustment, where required, can be obtained by using extenders. See information above and the technical literature.
- **Installation:** System to be installed in accordance with the technical literature and installation instructions. If there is any doubt as to the exact requirements consultation should be made with Bauder Limited.

REF No: B150040 **PROJECT NAME: GLH – HAMPSTEAD ROAD**

840A LAYING PRECAST CONCRETE PAVING SLABS

- **Extent:** To designated areas – See landscape designers plan.
- **Support:** Slabs to be laid on the specified proprietary support pads, adjusted in accordance with the manufacturer's recommendations to ensure a flush, level finished surface.
- **Setting out:** Minimize cutting.
- **Joints:** 4.5 mm.
- **Completion:** Slabs must be level and stable.

COMPLETION

910 INSPECTION

- **Interim and final roof inspections:** in accordance with the manufacturer's requirements for guarantee.
- **Notification:** It is the responsibility of the approved contractor to advise Bauder Ltd when the roof is ready for Final Inspection. The 'Final Inspection' of the waterproofing must be carried out and approved by Bauder Ltd prior to any landscaping products/materials being installed, otherwise a guarantee cannot be issued.
- **Other requirements:** Please also refer to preliminaries / general conditions.
- **Site contact details - Site Technician:** Kevin Selfe, Tel: 07730 529852
- **Technical Contact Details - Area Sales Manager:** Hayden Davies, Tel: 07834 340087

940 COMPLETION

- **Roof areas:** Clean.
- **Outlets:** Clear.
- **Work necessary to provide a weather tight finish:** Complete.
- **Storage of materials on finished surface:** Not permitted.
- **Completed membrane:** Do not damage. Protect from chemicals, traffic and adjacent or high level working.

950B GUARANTEE

- A 20 year product and workmanship guarantee is to be provided upon completion following a Final Inspection by Bauder. Details regarding the full terms and conditions are available separately from Bauder Ltd upon request. This system must installed by a Bauder Approved Contractor, to be eligible for guarantee.

V I V E N D I
A R C H I T E C T S LTD

Bauder Tapered Insulation

Document Reference: 1470-BI

Specification drawing for Bauder insulation.

To be read in conjunction with Building Regulations Document and other Bauder specification documents.

UNIT E3U BOUNDS GREEN INDUSTRIAL ESTATE RINGWAY LONDON N11 2UD TEL/FAX +44 (0)20 3232 4000
EMAIL info@vivendiarchitects.com
Registered in England & Wales No. 6864628 VAT Registration No. 832 2718 40

Key:

= 62mm Flatboard Gutters

= 100mm FA-TE Flatboard Base Layer

= Direction of Falls in Tapered Insulation

= High Points of Tapered Insulation (Recommended Start Point for Installation)

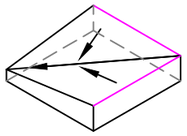
= Tapered Insulation

= Boards to be Chamfered

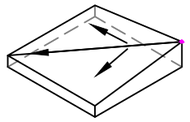
= Rooflight

= Access Hatch

Valley

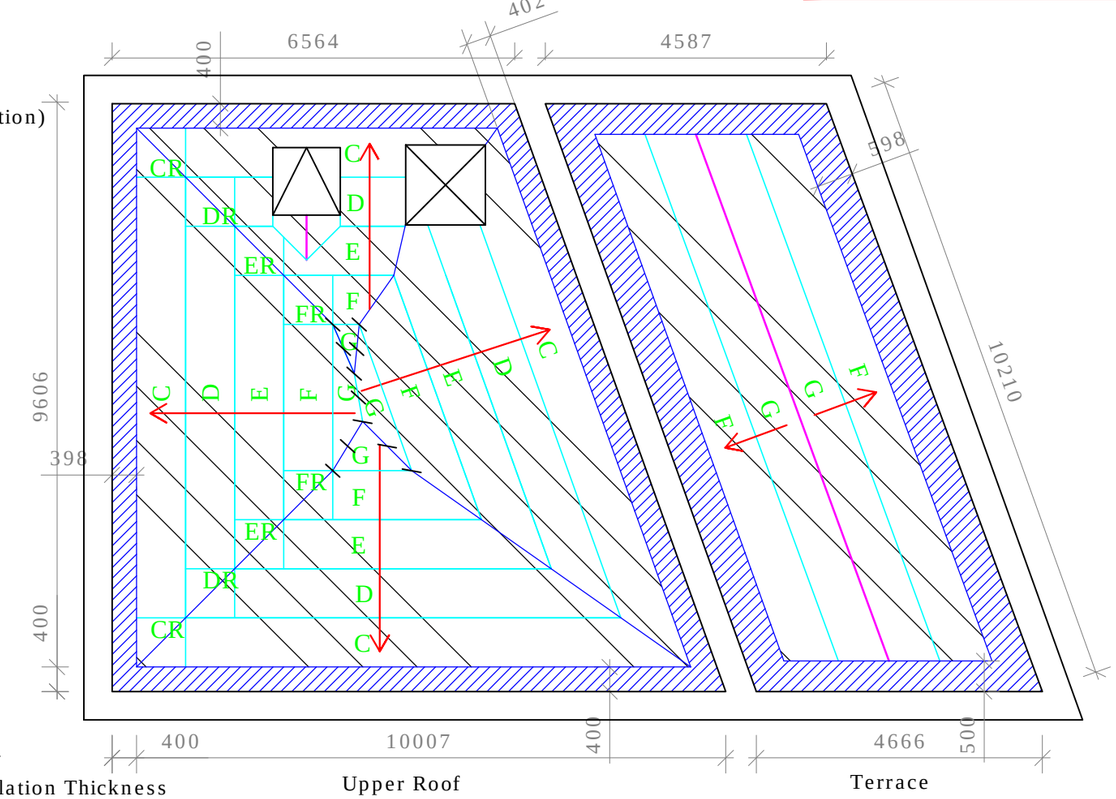


Ridge

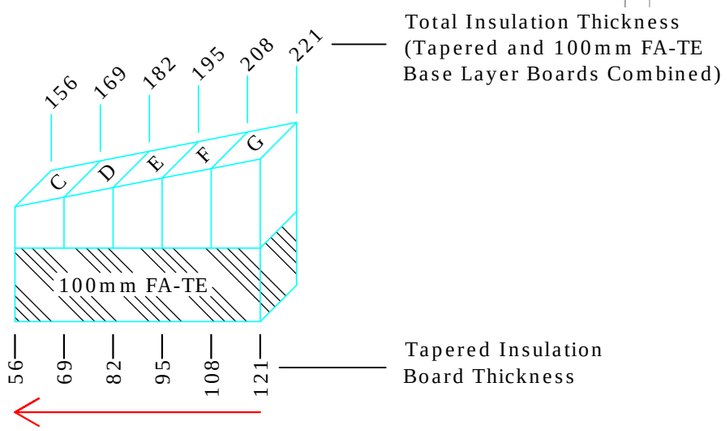


Ridges & Valley = 800mm x 800mm

Important Notice:
This scheme is of a MULTI-LAYER Design and as such extra Insulation Adhesive will be Required to Adhere the Taper Boards to the Base Layer/Overlay Layer.



1:60 PIR Tapered Boards (800mm x 1200mm)



NOTE REGARDING U-VALUES

The individual roof areas achieve the Average 'U' Values stated in the table. These U-Values are calculated according to BS EN ISO 6946:2007(E) Annex 'C'.

Roof Name Area:	Deck Type	Minimum U' Value	Average U' Value	Approximate Net Roof Area (m²)	Approximate Area of Insulation to be Bonded (m²)	Total Insulation Required Inc Waste (m²)
Upper Roof	New Concrete	0.42 W/m² K	0.15 W/m² K	77.61	140.92	157.52
Terrace	New Concrete	0.42 W/m² K	0.15 W/m² K	44.55	73.41	77.52

INSTALLATION NOTES:

1. This drawing assumes a level deck unless otherwise stated. BAUDER tapered systems are designed for installation on level decks.
2. BAUDER LTD recommend that this scheme should be installed starting from the thickest boards, so that in the event of discrepancies in roof size, the flatboard areas can be modified accordingly.
3. Boards to be close butted and staggered. Upstands to perimeters, rooflights, tank houses etc, to be raised where necessary to incorporate the thickness of the insulation.
4. Mitre Boards are available in all falls. They are denoted on this plan by an "R" or a "V" to signify Ridge and Valley. The corner of the board marked "R" or "V" is where the high point of the board should be located.
5. Please note that all offcuts of tapered insulation boards over 300mm should be used within the scheme. These are not deemed as waste boards by Bauder.

NOTE:

Although this tapered insulation scheme is designed to help shed water from the roof, we cannot guarantee that ponding will be totally eliminated. Please note that ponding water may occur around the flatboard gutter area due to a lack of cross falls. However this is not detrimental to the Bauder system

All Dimensions, positions of Rooflights and Outlets are to be checked on site BEFORE the tapered scheme is ordered.

Rev	Date	Description	Drawn By
2	19.11.15	Both roof areas revised to multilayer and gutter	JP
		added to Terrace roof as per ATSM request	
1	09.02.15	Int. Gutter Added To Terrace	GSW

BAUDER

UK OFFICE
Bauder Limited
70 Landseer Road, Ipswich,
Suffolk IP3 0DH,
England.
Tel: +44 (0)1473 257671
Fax: +44 (0)1473 230761
Email: technical@bauder.co.uk
bauder.co.uk

IRELAND OFFICE
Bauder Limited
O'Duffy Centre, Cross Lane,
Carrickmacross, Co. Monaghan,
Ireland.
Tel: +353 (0)42 9692 333
Fax: +353 (0)42 9692 839
Email: technical@bauder.ie
bauder.ie

Contractor to be responsible for checking this scheme against architects drawings/site requirements and to advise Bauder immediately of any discrepancies. Orders placed against this drawing reference assume approval of this scheme. Any materials required over and above the quantities given, will be charged accordingly.

Contract Name:
GLH, Hampstead Road, London, NW1

MULTI-LAYER TAPER SCHEME

Contract No:	B150040/1		
Drawing No:	B150040 - 1 - LTFA		
Designed to Drawing No:	1470-BR02-RF Revision P1		
Scale:	1:100 @ A3		
Drawn By:	J Pulford	Date:	09/01/2015

Date: 14-03-12

TECHNICAL DATA SHEET

Bauder Xero Flor XF301 Sedum Blanket

DESCRIPTION

The Bauder Xero Flor XF301 vegetation blanket is a unique sedum mat product developed for use directly over the waterproofing system without the need for a secondary substrate growing medium, making XF301 the lightest self-contained sedum blanket system available.

It incorporates a polypropylene mesh bonded to a vapour permeable base carrier sheet. This ensures that the blanket substrate is contained, doesn't compact and helps to maintain the vegetation in optimum condition.

The product also has an integral moisture retention fleece that can absorb and retain up to 5 L/m² of water. The vegetation within this product is a mix of hardy sedum species with some grasses and moss also present.

TECHNICAL DATA:

Composition	
Mineral component	recycled crushed brick and expanded clay shale
Organic component	composted pine bark
Technical Performance	
pH value	6.5 – 7
Vegetation support layer	geo-textile carrier filter layer with bonded UV resistant nylon loops
Moisture retention fleece	recycled fibres (80%man-made, 20% organic)
Weights and sizes	
Standard roll width	1 m
Standard roll length	2 m
Non-standard lengths	up to 10m (cut only in increments of 1m) installed with a crane attachment that is available from Bauder Ltd.
Thickness:	ca. 28mm (excluding vegetation)
Saturated weight:	44Kg/m²
Fire Rating	
BS 476 Part 3:2004	Ext. F. AA Ext. S. AA
Supply Form	Rolls of blanket to specified lengths (as above)

UNITED KINGDOM
Bauder Ltd
70 Landseer Road
Ipswich Suffolk England IP3 0DH
T: +44 (0)1473 257671 E: info@bauder.co.uk
bauder.co.uk

IRELAND
Bauder Ltd
O'Duffy Centre Cross Lane Carrickmacross
Co. Monaghan Ireland
T: +353 (0)42 9692 333 E: info@bauder.ie
bauder.ie

DELIVERY INFORMATION

- Deliveries of the Bauder XF301 Sedum Blanket are made from Tuesday to Friday.
- In exceptional weather we are unable to harvest the product for delivery until conditions improve. We are only able to advise the day before delivery if such a problem occurs.
- Order no more blanket to be delivered to site than can be installed within 24 hours of delivery.
- Should the blanket be considered faulty it is imperative that the Bauder sales office is informed on the day of delivery.
- If, for any reason, it is not possible to install the blanket on the day of delivery, the product should be rolled out on a flat, level surface, lightly watered and left out overnight before re-rolling for use early the following morning.

INSTALLATION INSTRUCTIONS – 2 X 1M ROLLS

- Ensure that the waterproofing has first been given and passed Final inspection by the Bauder Site Technician and that all waterproofing attached accessory items such as edge trims or retention stripes are installed.
- If large areas are to be installed then watering and installation should be done in sections of as much area as can be completed within four hours.
- It is important to ensure that width rolls are used at all roof perimeters i.e. no thin strips or small pieces that would otherwise present a wind uplift risk. Any 'cutting in' of thinner strips must be made in the field area, with the cut being made opposite to the selvedge to maintain continuity during installation.
- Working from the bottom left hand corner of the roof and taking care not to stand on the vegetated surface, unroll the blanket apply firmly onto the waterproofing, ensuring that the selvedge is unfolded and cleaned to remove any over-growing vegetation. This is important to ensure that the blankets are installed tightly butted together with no gaps.
- The blanket is fully inserted in to SS40 edge retention trim where this is installed.
- Continue on up the slope with the next roll, taking care to ensure that the junction between the two rolls is tightly butted. Full any gaps with the extra substrate provided.
- When the first row of blankets are installed and the selvedges unfolded, the contractor is to use a short piece of 50 x 50mm or similar softwood timber to run up and down the selvedge, lightly pressing up against the substrate and vegetation adjacent to remove all surplus material and leave a clean edge to butt the next blanket up to. The surplus substrate and vegetation is to be collected and set aside for future use.

UNITED KINGDOM
Bauder Ltd
70 Landseer Road
Ipswich Suffolk England IP3 0DH
T: +44 (0)1473 257671 E: info@bauder.co.uk
bauder.co.uk

IRELAND
Bauder Ltd
O'Duffy Centre Cross Lane Carrickmacross
Co. Monaghan Ireland
T: +353 (0)42 9692 333 E: info@bauder.ie
bauder.ie

- Upon completion of the area, the previously collected surplus substrate is to be used to dress into and make good any joints where the blanket edges are not tightly butted. Excess vegetation spouts removed from cleaning the selvedge can be applied to filled gaps/joints or any bare areas and these will usually root and establish within a couple of weeks.

- In order to keep all joints correctly spaced and well-made it is recommended that no more than three rolls should be installed before adjacent rolls are added to the installation.

- Commence the next row of blankets with a ½ roll, to create a staggered brick-bond laying pattern with the row previously installed.

- At abutments and penetrations the blanket may be cut using a sharp knife and straight edge. It is generally easier to cut up through the carrier on the underside of the blanket than to cut through the vegetation. Alternatively, a disc cutter can be used (using the appropriate safety equipment i.e. gloves and eye protection). Before cutting using this method, ensure that protection is applied to the waterproofing beneath using a timber plank or plywood sheet.

- In situations where the vegetation barrier secures the blanket edges against wind uplift, the 20/40 mm pebble loading must extend onto the leading edge of the blanket by a minimum of 100mm.

- Upon the completion of an area installed over a maximum 4 hour period the installation is to be heavily watered to ensure that the blanket and substrate are saturated before moving on to the next area.

- Upon completion of the installation apply Bauder organic slow release fertilizer at a rate of 80g/m2 using the approved applicator trolley and thoroughly watered in.

- Care is to be taken to avoid the blanket being walked or stood upon unnecessarily or trafficked by other trades during and after the installation, as this will have an adverse effect on the vegetation.

INSTALLATION OF LONG ROLLS

- The Bauder XF301 blanket can be supplied in long rolls in 1m increments from 3m to 10m.

- It is the contractor's responsibility to ensure that adequate unloading facilities and storage space on site will be available before the product is ordered.

- It is the contractor's responsibility to ensure that the appropriate crane with sufficient reach, load capacity and the Bauder crane attachment are present on site at the time of delivery.

UNITED KINGDOM
Bauder Ltd
70 Landseer Road
Ipswich Suffolk England IP3 0DH
T: +44 (0)1473 257671 E: info@bauder.co.uk
bauder.co.uk

IRELAND
Bauder Ltd
O'Duffy Centre Cross Lane Carrickmacross
Co. Monaghan Ireland
T: +353 (0)42 9692 333 E: info@bauder.ie
bauder.ie

- In addition to the crane driver, a workforce of 3 or 4 is required to carry out the installation efficiently. One of the operatives on the roof will need to give directions to the crane driver.

- If you have not previously carried out a Bauder long roll installation, please ensure that the Bauder Site Technician responsible for the project is informed at least 2 weeks before installation is due to commence, to ensure that the correct level of site support is provided.

- The general principals of installation for long rolls are the same as for 2 x1m rolls, with the exception that the roll ends must be staggered a minimum 1m in length instead of ½ roll, to ensure staggered joints.

ESTABLISHMENT MAINTENANCE

- After completion of the installation it will be necessary to keep the substrate and blanket damp for a period of at least 4 weeks immediately afterwards, and it may be necessary to irrigate for longer than this if installation is followed by a warm, dry spell of weather.

- Please do not over-water! It is equally important to ensure that the green roof substrate does not become totally saturated by either excessive watering through periods of cool, wet weather. Further information on watering requirements for this product is available to view or download from the Bauder web site www.bauder.co.uk. Log in and visit our Technical Centre and review the document "Watering Requirement Guidelines for Extensive and Bio-diverse Green Roof installations"

- To encourage the plants to survive without too much irrigation and to harden them off in readiness to survive winter, it is important to start cutting back on watering from early September.

- The maintenance requirement in the following years will depend upon the weather experienced through the winter and early spring of each year and should follow our standard biodiversity green roof maintenance guidelines.

SUPPORT

- Modern extensive and bio-diverse green roof installations will normally require only minimal maintenance. Bauder is happy to offer advice on any issues concerning your green roof and enquiries should be forwarded to our Green Roof Technical Department at the address below.

- We believe our products and systems are of the highest standard and are always prepared to discuss any queries or concerns that may arise. Providing photographs or drawings to accompany your queries will help speed our response.

Please note: In the event of any query arising which it is thought may affect the condition of the system, then Bauder Ltd should be contacted at the address below. We cannot accept responsibility for any problem or failure due to use outside those parameters for which the system was designed or 'acts of god' beyond our control e.g. extreme weather conditions or damage through pests.

UNITED KINGDOM
Bauder Ltd
70 Landseer Road
Ipswich Suffolk England IP3 0DH
T: +44 (0)1473 257671 E: info@bauder.co.uk
bauder.co.uk

IRELAND
Bauder Ltd
O'Duffy Centre Cross Lane Carrickmacross
Co. Monaghan Ireland
T: +353 (0)42 9692 333 E: info@bauder.ie
bauder.ie

Rev. 4 dated 28.8.14

Watering Requirement Guidelines for Extensive and Bio-diverse Green Roof Installations

CONTENTS

1. INTRODUCTION

It is essential that all types of green roof, regardless of the planting specified, receives the correct level of care and attention immediately after completion, to ensure that the plants installed can rapidly and healthily establish within their new rooftop environment.

Essential to this process is the provision of an adequate water supply of sufficient pressure to roof level, to deliver either temporary watering during the proposed period of plant establishment or otherwise a permanent installed irrigation system that can provide watering on demand.

The type required is dependent upon the landscaping system specified and this is outlined in the sections below.

The following information is intended as a guide to assist in the planning of establishment watering and where installed, permanent irrigation, as being part of the long-term management and maintenance of all Bauder Extensive green roof systems.

It is recommended that this document is read alongside the appropriate Bauder installation and establishment maintenance guidelines together with general maintenance guidelines for the proposed vegetation type.

2. WATERING REQUIREMENTS PARTICULAR TO SPECIFIC BAUDER EXTENSIVE LANDSCAPING SYSTEMS

XERO FLOR XF301 LIGHTWEIGHT SEDUM BLANKET SYSTEM

This product does not require installation over a substrate growing medium, as the growing medium and moisture retention are self-contained, making this system the lightest of its type currently available. Bauder SDF Mat drainage layer is incorporated if the roof falls are less than 2°, otherwise the blanket is applied directly to the waterproofing.

A key advantage of XF301 is that it can be installed on slopes of up to 25°, without needing a heavily constructed and expensive landscape retention system, instead using a unique spiked retention component attached at set intervals to the waterproofing surface.

One consequence of being so lightweight and of shallow build-up, is the importance of annual maintenance, particularly fertilizing, as the system has little inherent nutrient.

The benefit of applying a shallow build-up on steeper slopes can also have a consequence in respect of water retention capacity and therefore provision for artificial irrigation should be allowed for under certain conditions. These are outlined below: -

Sedum blanket being applied to a steep sloped roof, fitted with both retention strips and drip line irrigation.

- Roof falls up to 2° - No artificial irrigation required
- Roof Slopes in excess of 5 degrees, exposed locations or south facing – Consider
- Roof Slopes in excess of 10 degrees – provision for irrigation considered essential
- Slopes from 1-5 degrees coastal or exposed locations – Consider
- Slopes in excess of 5 degrees coastal, south facing and exposed locations – provision for irrigation considered essential

For roofs less than 50 m² in area and single storey in height, irrigation can be achieved using a simple hose and sprinkler arrangement, but for larger areas it is more practical and cost effective to install a permanent drip line system.

Watering with an irrigation system is still periodic and only necessary during prolonged periods of drought or otherwise to maintain appearance. Over-watering will encourage grass and other weeds to establish and is not generally good for sedum plant health, as the plants need to go through the drought process to become hardy for surviving extreme weather conditions. Therefore watering once every 4-6 days during hot, dry periods, during dawn or dusk is recommended.

3. VEGETATION OVER A SUBSTRATE GROWING MEDIUM

This applies to the following Bauder vegetation finishes: -

- Xero Flor XF118 wild flower blanket
- Xero Flor XF300 sedum blanket
- Bauder Traditional and UK Native Species plug plants
- Bauder KS Plus seed mix

All of the above vegetation options are installed either over or within Bauder Extensive Substrate growing medium. These extensive green roof systems are generally intended to persist without any form of artificial irrigation once the vegetation is established.

However, aspect and location are factors that have a bearing and together with consideration towards our changing climate over the long-term means that provision for watering needs careful assessment. The broader range of vegetation now being used and the visual appearance sometimes demanded there will be projects that will require or benefit from the inclusion of a permanent irrigation system or water feed to roof level fitted during construction.

This does not necessarily mean a requirement for regular irrigation, but it does ensure that during times when additional watering above and beyond normal rainfall is required, this can be provided.

In particular, this applies to sloped roofs over 5° and the system types where permanently installed irrigation provision should be considered, are listed below: -

- Bauder XF118 – Consider for enhanced visual appearance
- Bauder UK Native Species Plug Plants – Consider for enhanced visual appearance
- Bauder KS Plus seed mix (both during and after planting has become established) – Consider for enhanced visual appearance

Regardless of the green roof system specified, we would always recommend that sufficient watering points of adequate pressure are always provided at roof level to allow the entire roof area to be irrigated by hose and sprinkler during particularly prolonged periods of drought. It is cheaper periodically to add water than to replace planting.

4. WATERING DURING AND IMMEDIATELY FOLLOWING INSTALLATION

For all applications involving substrate growing medium, the substrate should be thoroughly watered to moisten it before the planting is installed and also to fill the underlying water storage board, so that some water retention is provided.

Once the planting has been installed, apply Bauder Xero Flor organic fertilizer at a rate of 80g/m², by using the recommended applicator trolley which ensures adequate and even pellet coverage.

Thoroughly water the vegetation immediately after installation or as soon as a sufficient area of planting is installed that can be watered using sprinklers.

Initial watering must be by surface mounted sprinklers to water in the fertilizer. Do not over-water the fertilizer if the substrate is already well moistened. Use just enough to wash the fertilizer pellets off any vegetation leaves to prevent burning.

Special note Regarding Bauder KS seed mix

This seed mix is provided in a formulation that allows it to be applied direct to a moist substrate and should not be watered in after installation, but left to germinate and establish at its own pace, requiring irrigation only in prolonged drought conditions once established.

5. ESTABLISHMENT WATERING

Establishment watering needs to be correctly managed to ensure that the landscaping is kept sufficiently moist to encourage strong root development whilst ensuring that the system never becomes too wet.

All newly installed sedum blanket vegetation will require watering for at least the first month after completion.

The wild flower, herb and rockery vegetation species used in all other extensive/bio diverse green roofs will need to receive irrigation for at least 10 weeks after completion, and will require close attention over the first 4 weeks to ensure that the system is kept moist without becoming over-saturated.

Frequency of watering is dependent upon the time of year and current weather conditions, but with sedum vegetation this is usually only required every 4-6 days during the summer months. With all other species it is possible that watering could be required on a more frequent basis in hot weather, which can only be determined by a visual inspection to review if the plants are wilting.

Water the vegetation for a period of approximately 1-2 hours to ensure that the growing medium is fully saturated. If the green roof has a leaky pipe or drip line irrigation system fitted then this can be employed to provide the required post-installation watering.

Please note that drip line irrigation is not suitable for initial watering in of the fertiliser, and therefore surface sprinklers should be used - see item 4 above.

6. METHODS OF WATERING AND THE EQUIPMENT REQUIRED

Temporary watering

There are a number of methods that can be used to facilitate temporary watering on site and these would be employed for establishment watering, for those landscapes not requiring any permanent irrigation, or otherwise when the permanent irrigation is not yet operational.

It is important to have a main's feed (or several mains feeds) to roof level of sufficient pressure to water the total vegetated area. A hub may be set up to then distribute water to the various areas via a set of secondary feeds.

Example opposite of a temporary watering system hub rigged up on site to provide adequate mains watering feeds to different roof areas.

These help the contractor managing installation and establishment watering to control irrigation from a central point, whilst retaining flexibility if the apparatus needs to remain mobile.

In situations where the mains water pressure is found to be insufficient, a Bowser can be used together with a pump, to provide water at the required pressure to roof level.

Mobile Bowsers are fine as a solution for temporary watering during installation where a mains feed is not yet available or for short term watering i.e. establishment watering of XF301 sedum blankets.

However, for longer term establishment watering as is required for XF118 wildflower blankets, where this can be required for up to 10 weeks, a permanent feed to roof level of the required minimum pressure is necessary.

Image supplied courtesy of Morclean Ltd

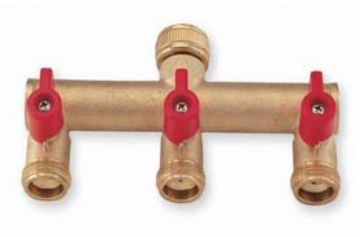
Rev. 4 dated 28.8.14

Requirements for mains water supply

A supply of mains water must be provided on site prior to the delivery and installation of the vegetation.
A minimum of 3 bar pressure at roof level is required to provide sufficient pressure to enable up to four sprinkler units to operate simultaneously. This is sufficient to cover an area of approximately 450 m² at any time, depending upon the water supply available.

Testing the water pressure

The water pressure and flow available from the mains feed must be checked with a suitable pressure gauge (see opposite) to confirm that the system is adequate in advance of the installation of the vegetation.



Multiple Hose connectors

Three-way multiple brass hose connectors provide a quick and efficient method of connecting up several hoses to the mains supply simultaneously.

Heavy duty hose pipe

Sufficient lengths of heavy duty hose to be provided to reach all roof areas

Pipe joiners

Hose pipe can be extended to the length required using these proprietary brass pipe joiners

Small Areas up to 20m²

An adjustable spray head is suited for very small areas and for watering in fertilizer

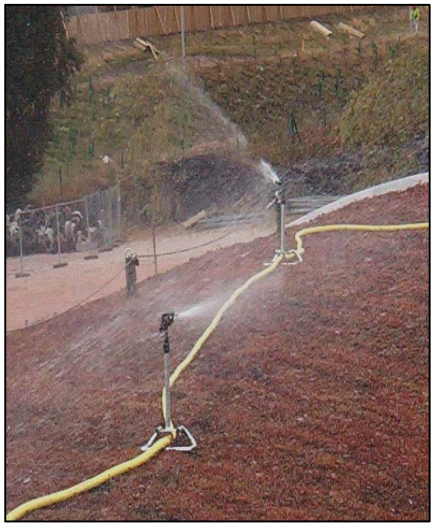
Areas under100m²

Used with narrower head nozzles or alternatively use domestic oscillating sprinklers

Areas over 100 m²

Surface mounted sled riser units with changeable sprinkler heads give variable spray pattens

Watering roof areas over 100m²



Riser units can be 'daisy chained' together to irrigate the length of the roof. Sprinkler heads can be changed to enable different spray patterns to be employed to suit each roof area as required.

Several roof areas can be watered simultaneously using a multi-connector at the mains, so long as sufficient water pressure and flow is available for each separate feed.

When watering large roofs on public buildings such as schools, these will often have water meters fitted. The occupiers may wish a meter reading to be taken before watering commences, so that the cost of the water usage can be separated and later reimbursed.

Time control for evening irrigation

Battery operated timer control units are available to help control watering efficiency. These can be set to allow watering at dawn or dusk when wind and evaporation levels are at their lowest, thus preventing unnecessary water loss.

This facility is important for installations carried out during the dry summer months, as it enables the water to saturate the sedum blanket or substrate system which gives the plants the opportunity to take on and store water.

A separate timer will be required for each hose run in operation.

Permanent Drip line irrigation

This system can be installed for both occasional and regular watering. The system layout and components required for any individual green roof system will be dependent upon a number of factors, including vegetation type, substrate depth and roof slope. We would strongly recommend seeking project-specific advice from a specialist irrigation company to ensure that the proposed system will meet required criteria.

A minimum of 2 bar pressure at roof level is required for most systems to operate correctly. The system must be fully operational with all operational controls easily accessible for use. The irrigation system would normally require Category 5 back-flow prevention.

A permanent drip line system (where installed) is not suitable for the task of carrying out the initial surface watering after fertilizer has been applied. Fertilizer should be properly watered in using surface watering sprinklers to prevent burning the leaves and damaging the plants.

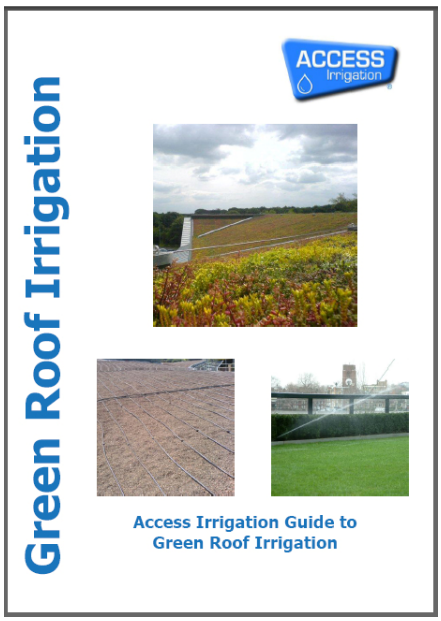
Watering is best carried out automatically at dawn or dusk using a timer control unit.

7. SPECIALIST ADVICE

Advice and Supply of Irrigation equipment

Access Irrigation Ltd is one of the country's longest established irrigation specialists and has considerable experience in many types of irrigation, including green roofs.

They are happy to provide irrigation advice on any Bauder project and can supply a wide range of irrigation products and technical advice.



Please contact: -

Access Irrigation Ltd
Crick
Northampton
NN6 7XS

T: 01788 823811
F: 01788 824256
E: sales@access-irrigation.co.uk
W: www.access-irrigation.co.uk

Technical Advice on Installation and maintenance of Extensive green roof systems

For project specific advice relating to establishment watering and irrigation issues that relate specifically to Bauder Green Roof systems, please contact our Technical Department using the details below.

Bauder Ltd

United Kingdom
70 Landseer Road, Ipswich, Suffolk IP3 0DH England

Ireland
O'Duffy Centre, Cross lane, Carrickmacross, Co.Monaghan.

T: +44 (0)1473 257671
F: +44 (0)1473 230761
E: technical@bauder.co.uk

www.bauder.co.uk

SEDUM BLANKET ESTABLISHMENT

OUR PROMISE TO THE CLIENT

It must be recognized that Bauder Sedum Blankets are natural, living products.

Every blanket we produce is UK grown and matured using the same methods, with a seed mixture of up to 11 varieties. As well as sedums, the mature blankets can also be expected to contain a small amount of other plant varieties such as grasses, wild flowers, herbs etc.

However, the transition from field to roof may cause temporary distress to the plants, and this coupled with the different growing environment may possibly result in some changes in appearance.

The rate at which the vegetation adapts to its new environment depends on weather conditions, location, and type of roof, as well as the care it receives during its establishment period. It is therefore important to provide aftercare to a newly installed system.

Although the weather is outside of our control, we promise to ensure that the vegetation becomes established as quickly as possible, providing safe access to the roof, and a safe working environment exists. It is the main contractor/ building owner's responsibility to ensure that the vegetation does not dry out within the first month following installation (care should be taken not to over water), but we will monitor the progress of the planting throughout this period to ensure that the plants become fully established within 12 -18 months.

Once the plants are established little attention is required, and the client will be supplied with all the information needed to maintain the roof. However, the Bauder helpline will remain available for free information and advice should this be required.

It is the combination of UK grown sedum blankets and aftercare that ensures the success of Bauder Sedum Blanket systems.

Sedum species in current blankets

Sedum acre
Sedum album 'Bella d' Inverno'
Sedum album 'Coral Carpet'
Sedum ewersii
Sedum kamtschaticum subsp. Ellacombianum
Sedum kamtschaticum var. floriferum 'Weihenstephaner Gold'
Sedum montanum subsp. orientale
Sedum pulchellum
Sedum rupestre (reflexum)
Sedum sexangulare
Sedum spurium mesemlanthemum = Delosferma
Sedum spurium mesemlanthemum = hallii
Sedum verticillatum

Ray Stephenson is one of the worlds leading authorities on sedum plants and is the chairman of the Sedum society. He was commissioned by Strodhoff & Behrens last year to produce a study report on sedum species particularly suited to the UK climate, including coastal and exposed sites. This is the basis of the plants currently used within our blankets (although many of these were already being used).

There are currently 13 varieties used (dependent upon seed availability – see above). The mix will vary from blanket to blanket, but we expect at least eight species present in each blanket. The percentage mix of each species is also variable.

Most species are self-propagating, but there are also some that naturally seed and then die afterwards, but will return the following year.

To date, we are the only company with a blanket produced in the UK that is compliant with FLL regulations and that has a BRE certified FAA fire rating. Part of this test is reliant upon a blanket that does not contain too much organic content and sedum species that does not produce too much dead vegetation after flowering. It is the volume of dead vegetation that creates a fire risk in dry weather conditions.

Species develop according to the location. Inevitably, some species will dominate a site more than others and it is to be expected that accordingly some species may not survive long-term. The key to maintaining variety is annual maintenance and fertiliser at the correct time, to keep all species happy.

Notes from Ray Stephensons visit

1. Location – more rainfall in the west of the country than in the east. Irrigation to be considered for east located sites on slopes over 3 degrees.
2. Sedums are salt tolerant (coastal sites)
3. South facing aspects – irrigation for 30 degree slopes and above.

Rev 6 dated 4.10.11

MAINTENANCE PROCEDURE

BAUDER EXTENSIVE GREEN ROOF SYSTEMS

What to Expect From a Bauder Extensive Green Roof System

There is a common misconception that extensive green roofs, and sedum plants in particular, are always green and that from ground level they resemble grass. This is misleading, as they consist mainly of low growing, drought tolerant sedum plants and may also include other species such as Saxifrage, wild flowers, grasses, moss and herbs.

The appearance of the vegetation within an extensive green roof will change year on year, dependent upon fluctuations in the seasonal weather throughout the period. It should also be expected that more grass and moss will be present during the wetter months, because the conditions will be ideal for these species to exist, although they will tend to die off during the dry summer months, as free-draining extensive substrates will not hold sufficient moisture for them to survive.

It is another misconception that extensive green roofs are maintenance free, this is wrong and they are best described as 'low maintenance' rather than 'no maintenance'. As an example, the Xero Flor Sedum Blanket contains little in the way of natural nutrient, so fertiliser must be applied annually to ensure that the plants become resistant to extremes of weather and temperature.

The Bauder XF301 Sedum Blanket contains approximately 8-10 different plant species, some very similar in appearance to others but being more drought tolerant. Not every species incorporated will survive and the more dominant will be expected to prevail over time because they will adapt better to a particular location. Regardless of this, we would anticipate that at least 50% of the species will flourish.

Extensive green roofs that have a deeper substrate growing medium, where the vegetation is provided either by selected plug plant species, vegetation cuttings or seeds, will generally support a broader species mix, which can include wild flowers, grasses and herbs. An increased amount of dead vegetation will arise from this type of species mix following flowering, which will need to be cut back and removed, both to reduce the bio-mass on the roof and to encourage seed drop from the dead flower heads.

In the early spring the first signs of life returning to the vegetation within an extensive green roof are lead by any grasses present, quickly followed by a general "colouring up" of the sedum foliage, with other species following suit shortly thereafter. The growth and flowering of the individual species within the vegetation mix through the late spring and summer will be dependent upon the weather prevailing at the time, which will also determine which species will be most prominent in any given year.

In the winter, sedum plants will appear to shrink back, the leaves will become smaller and turn red/brown in colour as they prepare themselves to withstand the coming winter frosts. This gives extensive vegetation mixes a generally red/brown hue in the late autumn and winter months, which is sometimes mistaken for the plants being distressed, when in fact they are in optimum condition for the time of year.

General Maintenance

General maintenance is normally carried out annually during springtime. However, certain tasks which will be dependent upon the location of the roof, such as the removal of weeds, seedlings and accumulated leaf litter from overhanging trees may also need to be done during the autumn.

The following procedures should be carried out as indicated below, in order to ensure that the roof is maintained in good condition and to protect the validity of the guarantee.

Preliminary Maintenance Procedures:-

- Ensure safe access can be gained to the roof and that relevant Health and Safety procedures are followed when working at roof level. It is advised that the contractor should always seek proof of current maintenance for any man-safe roof access systems prior to proceeding with the work on site.

- Remove all dead vegetation and debris from the roof surface, taking particular care to ensure that all chute outlets, gutters and downpipes are clear. Where the species mix incorporates wild flowers and grasses it is recommended that all dead vegetation is strimmed off and the waste lowered to the ground and carted away.

  Please note! Roofs in the vicinity of taller trees will need more frequent maintenance. We recommend removing dead leaves during the spring and again in the autumn, to ensure that they to not damage the roof vegetation.

- Remove the lids of all Inspection chambers, ensure that all rainwater outlets and downpipes are free from blockages and that water can flow freely away.

- Ensure that any protective metal flashings and termination bars remain securely fixed in place. Advise the client of the need to repair or renew as necessary.

- Examine all mastic sealant and mortar pointing for signs of degradation. Advise the client of the need to repair or renew as necessary.

- Check that all promenade tiles and paving slabs are securely fixed to the roof surface and in good condition.

- Ensure that any new items of plant/equipment on the roof are mounted on suitable isolated slabs and that any fixings used to secure the plant/equipment in place do not penetrate the waterproofing. If in doubt, please contact Bauder for further advice.

- The Building owner should keep a record of all inspections and maintenance carried out on the roof. Any signs of damage or degradation to the waterproofing should be reported to Bauder immediately, in order that arrangements can be made for remedial work to be carried out if necessary. Damage to the landscaping should be reported to the building owner. If this damage includes Bauder components, then Bauder may be contacted for remedial advice.

- Works to adjoining areas - When carrying out maintenance to these areas, care must be taken not to damage either the landscaping or the waterproofing system. If it is considered that either has been affected, then Bauder should be contacted for advice. Any waterproofing damage caused after completion of the original installation may invalidate the guarantee.

- Alterations - Any unauthorised alterations to the waterproofing system will invalidate the guarantee. If such a situation should arise, then Bauder should be contacted so that we may advise on the alteration and how it should be incorporated without affecting the guarantee.

UK OFFICE
Bauder Limited
70 Landseer Road, Ipswich, Suffolk IP3 0DH, England
T: +44 (0)1473 257671 F: +44 (0)1473 230761 E:technical@bauder.co.uk
Bauder.co.uk

IRELAND OFFICE
Bauder Limited
O'Duffy Centre, Cross Lane, Carrickmacross, Co Monaghan, Ireland
T: +353 (0)42 9692 333 F: +353 (0)42 9692 839 E: info@bauder.ie

VEGETATION MAINTENANCE TASKS REQUIRED

The following tasks should be carried out annually: -

1 Plant encroachment.

Any vegetation which has encroached into drainage outlets, walkways and the vegetation barriers (pebbles) should be removed. The vegetation removed may be set aside and used to repair any bare patches if required (see below). If movement/settlement of the pebble vegetation barrier has occurred, additional washed stone pebbles similar to the existing are to be added.

2 Monitor the colour and rate of growth.

The colour and rate of growth of the vegetation should be reviewed to establish the health of the plants. It should be noted that many factors can affect the growth and colour of the vegetation and that plants tend to be greener in wetter, mild conditions (springtime) and where the roof pitch is shallow.

Notes!

- During May, June and July, sedum plants flower and you will see a mixture of colours – predominantly whites, pinks and yellows with some purple. The foliage of some species of sedum, such as Sedum Album "Coral Carpet", blush red naturally during the summer and autumn, and so the vegetation can take on a more 'red/brown appearance. This becomes more noticeable once plants have flowered, leaving remnants of dry brown seed heads. The best visible indication of the health of a plant is if the leaves are fleshy and contain plenty of water.
- When exposed to extreme conditions, sedum plants have a tendency to turn a deep red colour. This is a natural phenomenon and is important to help the plant to acclimatize, ready to survive a cold winter or hot summer. This will usually occur during extreme cold weather as well as periods of prolonged drought, in very exposed locations or when the plants are in distress through lack of nutrient (fertiliser).
- If an irrigation system is fitted, it is best to run it only during prolonged dry weather and for limited periods – see 'Irrigation' information below,
- If sedums are showing signs of distress, but have received regular rainfall, then the most likely problem is a lack of nutrient and a fertiliser should be applied.
- Only a relatively few species of sedum and other plants suitable for an extensive green roof installation will persist in partial and full shade, and they will generally be greener in colour and grow "leggier" in these locations. There will be a significant variance in the growth and colour between the plants growing in full or partial shade and those in full sun and this should be recognised as a feature of the living nature of each individual roof.
- If problems with the vegetation are suspected, Bauder may be contacted for advice and, if necessary, a suggested course of action.

3 Weeding.

With the exception of saplings, which should always be removed, weeds in an extensive green roof should be considered as a problem only of aesthetics. If considered excessive, they can be removed either manually or by using a 'spot weed wipe', ensuring that care is

UK OFFICE
Bauder Limited
70 Landseer Road, Ipswich, Suffolk IP3 0DH, England
T: +44 (0)1473 257671 F: +44 (0)1473 230761 E:technical@bauder.co.uk
Bauder.co.uk

IRELAND OFFICE
Bauder Limited
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T: +353 (0)42 9692 333 F: +353 (0)42 9692 839 E: info@bauder.ie

taken to follow specific instructions regarding the use of any proprietary products. After the removal of weeds and saplings, treat the affected area as if it were a bare patch (see below). All extensive green roof installations will at times include some moss and grass.

4 Repairing Bare Patches.

Bare patches can be easily repaired and this is best done during the main growing seasons of March/April or from late August until the end of September. Take vegetation cuttings from surrounding areas of abundant growth and place on bare patches, pressing gently into the soil. A light sprinkling of sand mixed with compost should then be dressed over the affected area to improve the uptake of the cuttings. The best results will be achieved if this work is carried out during spring maintenance and the affected area is kept moist for a short period afterwards. Please contact Bauder for further project-specific advice.

Please note: In areas of extreme exposure or where localised wind-swirl is caused by adjacent structures, it is possible that both the vegetation and substrate will be disturbed by periods of high wind. Should this occur, consideration should be given to how best to secure the installation against similar conditions in the future prior to re-instatement. If a problem of this type is suspected, Bauder may be contacted for advice and, if necessary, a suggested course of action.

5 Fertiliser for Bauder XF301 sedum blankets

Bauder Sedum Blankets are grown in a shallow growing medium which contains very little nutrient, so the annual application of fertiliser is crucial to ensure that the plants remain healthy. Fertiliser should ideally be applied during March/April, as it helps the plants to prepare for extreme weather conditions and flowering whilst also allowing the different species to gain sufficient nutrients without competing against each other.

Organic fertilizer can be obtained direct from Bauder in 25kg bags, which is sufficient for an area of 312.5m2 when applied at the recommended rate of 80gm/m². Areas of up to 30m² may be applied using either a hand held spreader or strewn by hand from a bucket. Larger roofs should always be done using a trolley applicator, which can be purchased direct from Bauder. Always apply the fertiliser at the given rate written on bag.

It is recommended that the fertiliser is lightly 'watered in' immediately after application, to avoid "burning" of the foliage, which may occur if fertilizer pellets settle on the leaves. Dung-based organic fertilizers should be avoided.

6 Fertiliser for either plug planted or hydro-planted extensive green roofs

Use a 6-month slow release chemical fertiliser with an NPK ratio of 15, 9, 14. Areas of up to 30m² may be applied using either a hand held spreader or strewn by hand from a bucket. Larger roofs should always be done using a trolley applicator, which can be purchased direct from Bauder. Always apply the fertiliser at the given rate written on the bag. This product may also be used on sedum blankets.

7 Irrigation

Extensive Substrate Installations

It is generally not considered necessary to irrigate extensive substrate green roof systems. It is, however, always advisable to ensure that there is a water supply point adjacent to the green roof, both to assist with general maintenance and as a precaution against extreme

drought conditions.

Bauder XF301 Blanket Systems
The sedum plants used in the Bauder XF301 blanket system absorb and store water in their leaves, which they then use to survive during periods of drought. The purpose of the moisture retention fleece, which is incorporated into the system beneath the blanket, is to hold water after rainfall to give the plants sufficient time to take on as much water as possible. The moisture retention fleece is not a water storage medium, so you should not be concerned if it dries out during periods of dry weather. If drought conditions arise it is important to check the plant leaves to see if they are still fleshy and not completely dried out.

When the Bauder XF301 blanket system is installed we recommend the provision of either a leaky pipe or drip line irrigation system where the following conditions apply: -

- All south-facing roof slopes exceeding a 5° pitch.
- All roof slopes exceeding a 10° pitch.
- Exceptionally windy and exposed site locations, where the wind can dry out the blanket.
- Sites up to 50 miles inland of the east coast of the UK mainland.

Irrigation should only be activated during prolonged periods of hot, dry weather, or if the sedum plants are showing signs of distress. The irrigation system is best activated for 2-3 hours, preferably at dawn or dusk to minimize unnecessary evaporation. Then once every 4-6 days for the duration of the hot weather conditions. This can be easily managed by using an inexpensive battery-powered, programmable timer.

Please note - continuous daily watering is neither recommended nor necessary, and will only promote weeds and other unwanted plant species.

Advice and Supply of Irrigation Equipment

Access Irrigation Ltd is one of the country's longest established irrigation specialists and has considerable experience in green roofs. They are happy to provide irrigation advice on any Bauder project and can supply a wide range of irrigation products. Please contact:-
Access Irrigation Ltd
Crick Northampton NN6 7XS
T: 01788 823811 F: 01788 824256 E: sales@access-irrigation.co.uk
www.access-irrigation.co.uk

Support

Extensive roofs should require only minimal maintenance. Bauder is happy to offer advice on any issues concerning your green roof and any such query should be forwarded to the Bauder Green Roof Technical Department at the address below in the first instance. We believe our products and systems are of the highest standard and are always prepared to discuss any queries or concerns that may arise. It is always of great help if you can provide photographs of the affected area(s) to accompany any such queries.

Please note: In the event of any query arising which it is thought may affect the condition of the system, then Bauder should be contacted at the address below. We cannot accept responsibility for any problem or failure due to use outside those parameters for which the system was designed or 'acts of god' beyond our control e.g. extreme weather conditions or damage through pests.

BAUDER

GREEN ROOF MAINTENANCE SERVICES

BAUDER GREEN ROOF SERVICE

A green roof is a real asset to a building and for it to continue to deliver the environmental and aesthetic benefits for which it was originally designed it is important to carry out maintenance on a regular basis.

A well maintained green roof will:

- Look its best and ensure the optimum range of species for maximum coverage and longer flowering periods
- Sustain healthy plant growth to provide a habitat for wildlife
- Improve air quality by reducing airborne dust and help local air cooling
- Offer protection to the waterproofing beneath
- Improve both acoustic and thermal insulation performance of the roof
- Help conserve and control rainwater runoff
- Maximise the building's asset value

SOME ISSUES RESULTING FROM A POORLY MAINTAINED ROOF

Unwanted Plant Encroachment

Saplings and other invasive plants can spoil your green roof and potentially damage the waterproofing or other building elements if not removed. Vegetation barrier functionality as a firebreak and fast drainage provision during high intensity rainfall is also affected by plant encroachment.

Fallen Leaves and Debris

The removal of leaf litter from overhanging trees and other accumulated debris is essential during Spring and Autumn to prevent plants from being suffocated and drainage outlets and gutters becoming blocked.

Lack of Nutrients

Lack of nutrients can lead to unhealthy plants, loss of vegetation coverage leading to bare patches and a reduction in the variety of species present.

An annual application of a slow release organic granular fertiliser is important for continual plant health. It helps to promote good vegetation cover which in turn helps with moisture retention, flowering and seeding and plant tolerance to temperature extremes.

Impeded Drainage

Functional drainage is important for plant health, as well as roof performance. Unimpeded outlets ensure the growing medium remains free-draining and does not become too wet, which could lead to unwanted vegetation, such as grass clumps and larger weeds establishing.

Regular maintenance and inspection checks ensure that the outlets and areas surrounding outlet inspection chambers remain clear and perform as intended.

WHY CHOOSE BAUDER TO MAINTAIN YOUR ROOF?

With over 30 years' experience in the design and supply of green roofs throughout the UK and Ireland Bauder can offer unparalleled experience and expertise in green roof maintenance.

Having established the largest UK facility cultivating green roof vegetation blanket we have unique knowledge and horticultural expertise for roofscape vegetation. With national coverage of over 50 field personnel, you can be assured of a prompt reliable service to fully meet your requirements.

OUR SERVICE

Bauder's experienced team will provide you with a tailor-made maintenance programme for your roof.

A Typical Bauder Maintenance Programme Includes:

- Full inspection and evaluation of your green roof
- Application of organic slow release granular fertilizer
- Removal of leaves and debris
- Removal of unwanted vegetation
- Inspection and clearance of outlets
- Examination and testing of irrigation

This work is undertaken by Bauder's experienced maintenance engineers who will carry out the necessary risk assessments and comply with all current health and safety legislation throughout the duration of the work.

Finally, you will be provided with a bespoke report with photographic verification outlining the condition of the planting and any areas requiring on going treatment.

To discuss your specific requirements please call our green roof service team for a no obligation quote.

T: +44 (0)1473 267119
E: greenmaintenance@bauder.co.uk

Chas Accredited

THE NATIONAL FEDERATION OF ROOFING CONCRACTORS LIMITED

INVESTORS IN PEOPLE | Gold

BAUDER

UNITED KINGDOM
Bauder Limited
70 Landseer Road, Ipswich, Suffolk IP3 0DH, England
T: +44 (0)1473 257671 **E:** info@bauder.co.uk
bauder.co.uk

IRELAND
Bauder Limited
O'Duffy Centre, Cross Lane, Carrickmacross, Co. Monaghan, Ireland
T: +353 (0)42 9692 333 **E:** info@bauder.ie
bauder.ie