
 Green Roof
 Brown Roof

Installation

- Vegetation mats must be laid within 24 hours of arrival on site in summer and within 48 hours of arrival in winter.
- If there are any delays with installation of the vegetation mats, all mats must be unloaded from the pallets, unrolled, spread out on the ground and watered immediately.
- Vegetation mats should be laid on a minimum substrate depth of 100mm.
- Vegetation mats should be laid on a damp substrate.

Irrigation

- Vegetation mats must be watered immediately after installation.
- Ensure that the water has soaked well in to the substrate beneath – this can be checked by lifting up a corner of the vegetation mat.
- Vegetation mats must not be allowed to dry out at any point during establishment – approximately 4-6 weeks (longer in winter).
- Provision should be made to water the vegetation mats through the first spring/summer growing season.
- The vegetation mats are designed to be drought tolerant. Provision should be made to water the vegetation mats through prolonged drought periods if necessary when establishment is important.

Cutting

- Vegetation mats should be cut once a year in late autumn after the plants have shed their seed.
- Cut the plants back to 50mm-75mm length using hand shears, a trimmer, or a mower and collect and remove the cuttings.

Fertiliser

- Vegetation mats perform best in low fertility situations. High fertility will encourage more competitive grasses and weeds.
- Do not fertilise either before or after laying the vegetation mats.

Maintenance

- Maintenance visits should be carried out at least once a year, and twice a year for the first two years.
- Maintenance procedures carried out at each visit could include the following:
 - Removal of unwanted plant material
 - Correction of any localized plant system problems
 - Replacement of any failed plants exceeding 5% of total plants installed
 - Removal of dead flower heads (if required)
 - Check on outlets and drainage
 - Replenishment of any areas of settled substrate
- At the end of year two negotiate a continuing programme of maintenance with a contractor on the basis of what is required to maintain a healthy plant regime.

Lindum Roof Substrate

| Product properties | Brown Roof (for seeding) | Green Roof (for Mats) |
|-------------------------------------------------------|--------------------------|-----------------------|
| pH | 8.3 | 7.7 |
| Electrical Conductivity | 1100 | 1500 |
| | µS/cm | µS/cm |
| Organic Matter ¹ | 3.1 | 3.5 |
| Nitrogen as N | 783 | 1200 |
| Total extractable | | |
| Ammoniacal Nitrogen N-N | 17 | 13 |
| Nitric nitrogen NO ₃ -N | 2 | 2 |
| NH ₄ -NO ₂ -N as N | 12 | 15 |
| Phosphorus as P | 59 | 474 |
| Total extractable | | |
| CAT ² extractable ³ | 5 | 8 |
| CAT ² extractable ³ | | |
| Potassium as K | 185 | 310 |
| Magnesium as Mg | 23 | 53 |
| Iron as Fe | 1 | 4 |
| Manganese as Mn | 4 | 5 |
| Sulphur as S | 14 | 35 |
| Copper as Cu | 0.1 | 0.15 |
| Zinc as Zn | 1.4 | 6 |
| Boron as B | 0.3 | 1.2 |
| Carbon Exchange Capacity | 6 | 24 |
| Particle Size Distribution (% air-dry sample passing) | | |
| 16.0mm | 100 | 100 |
| 3.0mm | 13 | 100 |
| 4.0mm | 3 | 91 |
| 7.0mm | 3 | 7 |
| 1.0mm | 2 | 4 |
| Air/Water Ratio (v/v) | | |
| JRM (JRM number) / JRM | 24 | 24 |
| Water Holding Capacity | 14 | 14 |
| At Field Capacity | | |
| JRM (Saturated) / JRM | 23 | 24 |
| Water Holding Capacity | 50 | 19 |
| At Field Capacity | | |
| Woods & Seeds | Nil | Nil |
| Stability mg CO ₂ /OH | 1.3 | 1.3 |

Lindum Roof Substrate

| Usage Depth | mm | 100 ± | 50-100 |
|--------------------------------|-------------------|-------------|-------------|
| Weight (Substrate) | kg/m ² | 100 ± | 50-100 |
| Settlement ² | | | |
| Vegetated (non-vegetated) | % | Nil (0.33) | Nil (Nil) |
| Resistant Run-off ³ | | | |
| Nitric Nitrogen as N | ppm | Nil (0.2) | 0.1 (47) |
| Phosphorus as P | ppm | 0.19 (0.19) | 0.05 (14.5) |

¹ Organic Matter (as loss on ignition/dry matter basis)
² Plant-availability
³ CAT² = aqueous solution of calcium chloride + DTPA (chelating agent) - an extractant originally developed for soils (and now specified in UK and European standards for composted materials (see PAS 100) because it is more representative for most nutrients than the water-extraction method originally developed for peat products only.
⁴ After 6 months intensive irrigation.
⁵ At 1.00K Pa

Lindum Green Roof Substrate and Brown Roof Substrate are blends of well-matured Green Compost to PAS 100 standards, and graded, dust-free reclaimed virgin brick fines. All materials are sustainable/recycled and UK-sourced for minimum carbon footprint.
 Packaging:
 Tube bags - 1.0m²
 20 litre Frost sealed sacks (0.6 bags - 1m² per pallet) (see below for marking floor installation for brown roof)

Contact details:
 Lindum Turf, West Grange, Thurgate, York, YO19 6DU
 Tel: 01904 448773
 Email: info@lindumgreenroofs.co.uk
 www.lindumgreenroofs.co.uk


Notes:
 Only the substrate and the Wildflower and Sedum Mats as specified on this drawing.
 Waterproof layers, drainage and associated layers are specified by the Architect.
 Substrate to be laid 100 mm thick for both Brown and Green Roofs. Substrate material as specified is to be laid to Brown and Green Roofs respectively.
 The depth of the substrate can be laid thicker in some areas and stones/rocks/limber added to increase the invertebrate habitat, adding any additional or different material must be subject to the approval of the Structural Engineer.
 Lindum Wildflower and Sedum Mat to be laid over substrate on Green Roofs. Brown roof to be remain unplanted for colonization by seed naturally.

Revisions:

| Rev. | Date | Description |
|------|------|-------------|
| | | |

Status of Drawing:

| Rev. | Date | Status |
|------|------|--------|
| | | |



West Grange
Thurgate
York YO19 6DU
Tel: +44 (0)1904 448773
Email: info@lindumgreenroofs.co.uk
www.lindumgreenroofs.co.uk

CONFIDENTIAL

Lindum Wildflower & Sedum Mat – species by type

| Wildflowers | |
|------------------------------|-------------------|
| Latin Name | Common Name |
| <i>Achillea millefolium</i> | Common Yarrow |
| <i>Scabiosa vulgaris</i> | Viper's Bugloss |
| <i>Cellium verum</i> | Lady's Slipper |
| <i>Hydrocotyle radicata</i> | Common Cress Leaf |
| <i>Limonium nigricum</i> | Rough Hound |
| <i>Limonium vulgare</i> | Common Cress |
| <i>Eleocharis acicularis</i> | Star Compass |
| <i>Verbascum thapsus</i> | Stink Moles |

| Sedums | |
|-------------------------|-------------------|
| Latin Name | Common Name |
| <i>Sedum spaldingii</i> | Sedum - yellow |
| <i>Sedum album</i> | Sedum - white |
| <i>Sedum spectabile</i> | Sedum - dark pink |

| Herbs | |
|------------------------------|-----------------------|
| Latin Name | Common Name |
| <i>Allium schoenoprasum</i> | Chives |
| <i>Andropogon virginicus</i> | Yellow Cranesbill |
| <i>Origanum vulgare</i> | Wild Marjoram |
| <i>Ranunculus acris</i> | Woad (Liver's Rocket) |
| <i>Ranunculus abortivus</i> | Golden Pimpernel |
| <i>Thymus vulgaris</i> | Common Thyme |

| Flowering perennials | |
|-----------------------------|---------------|
| Latin Name | Common Name |
| <i>Geranium columbinum</i> | Geranium Pink |
| <i>Ornithogalum vulgare</i> | Maiden Pink |
| <i>Platanus orientalis</i> | Pink Anemone |
| <i>Phlox paniculata</i> | Phlox - pink |

SCR/CSL 27-07-2010 CONFIDENTIAL



lindum wildflower & sedum mat
 A mixture of wildflowers, sedums, herbs and flowering perennials, specifically designed for green roofs and sustainably grown in the UK.

Working closely with the University of Sheffield's Dr Roger Dunwell and the Green Roof Centre, Lindum has developed the Wildflower & Sedum Mat to provide a biodiversity, ecological and drought tolerant range of wildflowers, sedums, herbs and flowering perennials that will flourish in the conditions created on many types of green roof.

Why choose Lindum Wildflower & Sedum Mat?

- It contains an attractive range of drought tolerant wildflowers, herbs, sedums and flowering perennials to increase biodiversity and provide a habitat for bees, butterflies and other insects.
- It is a mixture of wildflowers, sedums, herbs and flowering perennials, specifically designed for green roofs and sustainably grown in the UK.
- It is a mixture of wildflowers, sedums, herbs and flowering perennials, specifically designed for green roofs and sustainably grown in the UK.

Other products available from Lindum:
 Lindum Sedum Mats
 Lindum Green Roof Substrate
 Lindum Green Roof Fertiliser
 Lindum Green Roof Drainage

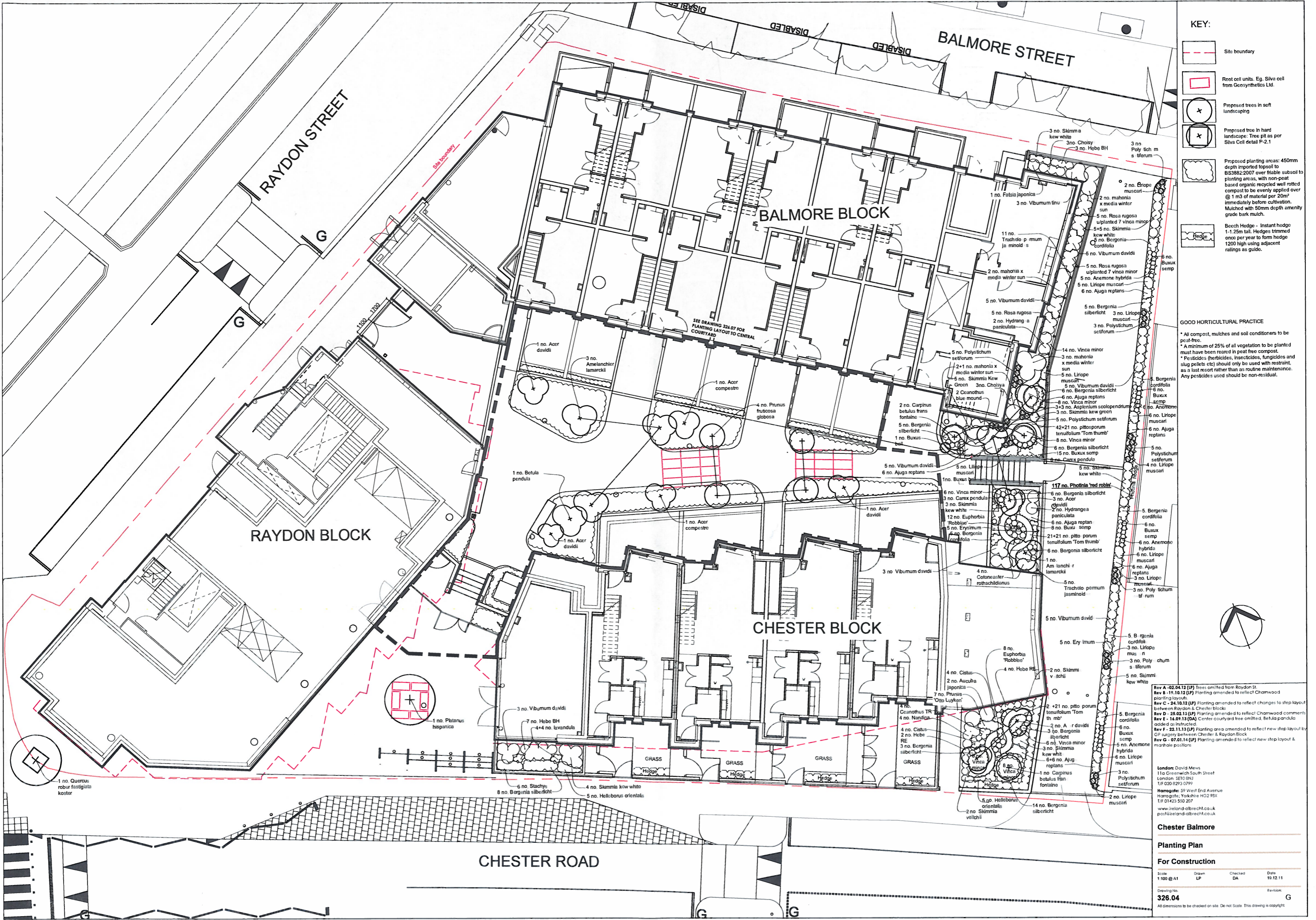
Contact:
 Lindum Turf, West Grange, Thurgate, York, YO19 6DU
 Tel: 01904 448773
 Email: info@lindumgreenroofs.co.uk
 www.lindumgreenroofs.co.uk

Technical specification

| PROPERTY | VALUE |
|-----------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| VEGETATION MAT | Lindum Wildflower & Sedum Mat |
| PRODUCT REFERENCE | Lindum Wildflower & Sedum Mat |
| PLANTING MIX | Lindum Wildflower & Sedum Mat |
| MATERIAL | 100% peat-free substrate |
| THICKNESS | 25mm |
| VEGETATION COVERAGE | 20% (at 100mm) |
| ROLL SIZE | 1.2m x 1.2m x 2.0m or 1.2m x 1.2m x 3.0m |
| SATURATED WEIGHT | 24kg (at 100mm) |
| MAXIMUM UP PER Pallet | 42 kg (at 100mm) |
| DELIVERY OPTIONS | Tube bags, 1.0m ² per bag 20 litre Frost sealed sacks (0.6 bags - 1m ² per pallet) Bulk loader or marking floor installation for brown roof |

Other products available from Lindum:
 Lindum Sedum Mats
 Lindum Green Roof Substrate
 Lindum Green Roof Fertiliser
 Lindum Green Roof Drainage

Contact:
 Lindum Turf, West Grange, Thurgate, York, YO19 6DU
 Tel: 01904 448773
 Email: info@lindumgreenroofs.co.uk
 www.lindumgreenroofs.co.uk



- KEY:**
- Site boundary
 - Root cell units. Eg. Silva cell from Geosynthetics Ltd.
 - Proposed trees in soft landscaping
 - Proposed tree in hard landscaping. Tree pit as per Silva Cell detail P-2.1
 - Proposed planting areas: 450mm depth imported topsoil to BSS82:2007 over friable subsoil to planting areas, with non-peat based organic recycled well rotted compost to be evenly applied over @ 1 m³ of material per 20m² immediately before cultivation. Mulched with 50mm depth amenity grade bark mulch.
 - Beech Hedge - Instant hedge 1.1-1.25m tall. Hedges trimmed once per year to form hedge 1200 high using adjacent railings as guide.

GOOD HORTICULTURAL PRACTICE

- * All compost, mulches and soil conditioners to be peat-free.
- * A minimum of 25% of all vegetation to be planted must have been reared in peat free compost.
- * Pesticides (herbicides, insecticides, fungicides and slug pellets etc) should only be used with restraint, as a last resort rather than as routine maintenance. Any pesticides used should be non-residual.

Rev A - 02.04.12 (LP) Trees omitted from Raydon St.
 Rev B - 19.10.12 (LP) Planting amended to reflect Charwood planting layouts.
 Rev C - 24.10.12 (LP) Planting amended to reflect changes to step layout between Raydon & Chester blocks.
 Rev D - 25.02.13 (LP) Planting amended to reflect Charwood comments dated as indicated.
 Rev E - 16.09.13 (DA) Center courtyard tree omitted. Betula pendula added as indicated.
 Rev F - 22.11.13 (LP) Planting area amended to reflect new step layout by GP surgery between Chester & Raydon Block.
 Rev G - 07.01.14 (LP) Planting amended to reflect new step layout & marble positions.

London: David Mews
 11a Greenwich South Street
 London SE10 8NJ
 T/F 020 8293 0799
 Harrogate: 37 West End Avenue
 Harrogate, Yorkshire HG2 9BX
 T/F 01423 550 207
 www.Ireland-albrecht.co.uk
 post@ireland-albrecht.co.uk

Chester Balmore

Planting Plan

For Construction

Scale: 1:100 @ A1
 Drawn: LP
 Checked: DA
 Date: 19.12.11

Drawing No: **326.04**
 Revision: G

All dimensions to be checked on site. Do not Scale. This drawing is copyright.



- KEY:**
- Site boundary
 - Root cell units. Eg. Silva cell from Geosynthetics Ltd.
 - Proposed trees in soft landscaping see drawing 326.04
 - Proposed tree in hard landscape: Tree pit as per Silva Cell detail P-2.1
 - Proposed planting areas: 450mm depth imported topsoil to BS3882:2007 over fibrous subsoil to planting areas, with non-pat based organic recycled well rotted compost to be evenly applied over @ 1 m3 of material per 20m² immediately before cultivation. Mulched with 50mm depth amenity grade bark mulch.
 - Climbers: laterals fixed to vertical strained wires at 600mm cts. see dwg 326.02
 - Clematis armandii
 - Hedera colchica 'dentata variegata'
 - Trachelospermum jasminoides

GOOD HORTICULTURAL PRACTICE

- * All compost, mulches and soil conditioners to be peat free.
- * A minimum of 25% of all vegetation to be planted must have been reared in peat free compost.
- * Pesticides (herbicides, insecticides, fungicides and slug pellets etc) should only be used with restraint, as a last resort rather than as routine maintenance. Any pesticides used should be non-residual.

CK



CHESTER BLOCK

R v A - 24.10.12 (LP) Planting amended to reflect changes to step layout between Roydon & Chester blocks
 R v B - 13.02.13 (LP) Planting amended to reflect Charwood comments
 R v C - 23.11.13 (LP) Planting amended to reflect new step layout by GP surgery between Chester & Roydon block
 R v D - 07.01.14 (LP) Planting amended to reflect manhole positions

London: David Munn
 116 Greenwich South Street
 London SE10 0JN
 T/F 020 8293 0799

Harrogate: 59 West End Avenue
 Harrogate, YO1 1 9BX
 T/F 01434 711111

www.irelandalbrecht.co.uk
 dsm@irelandalbrecht.co.uk



Chester Balmore

Planting Plan Detail area

For Construction

| Scale | Drawn | Checked | Date |
|----------|-------|---------|----------|
| 1:50 @ 1 | LP | DA | 18.10.12 |

Drawing: 326 07

All dimensions to be checked on site. Do not Scale. This drawing is copyright.