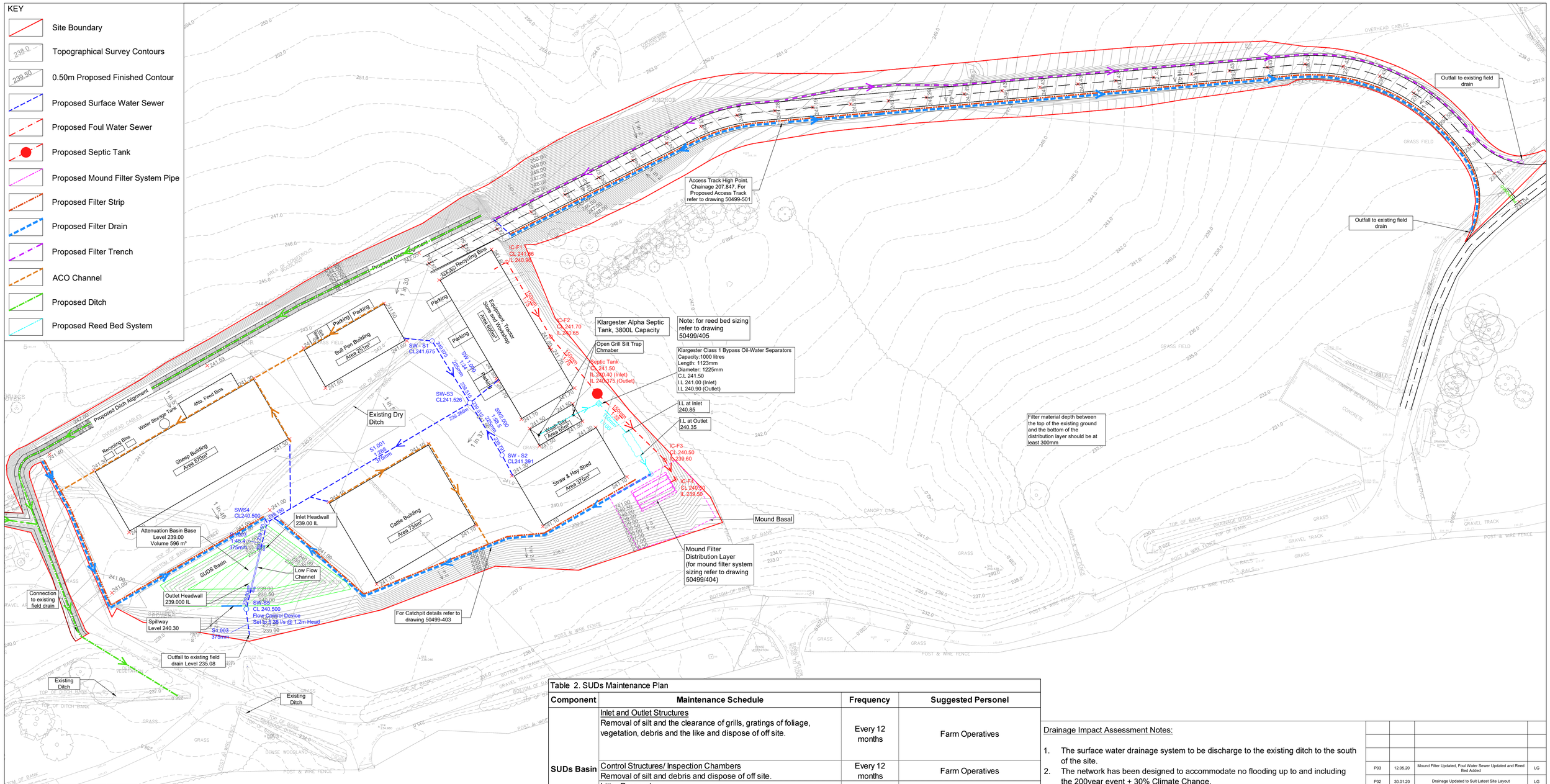
AGENDA ITEM 5

APPENDIX 1b

2020/0077/MSC

PLANS



Note: Please do not scale from this drawing

Surface Water Drainage Parameters:

Total hardstanding area:

Roofing =	2,954 m²
Yard areas =	5,933 m²
Total =	8,887 m²

Greenfield run-off (Qbar) = 5.38 l/`s
Attenuation required = 580 m³
Attenuation provided:

Basin =	611m³
Total =	611 m³ > 580 m³

Foul Water Drainage Parameters:

Mound Filter Distribution Layer Area: 63.00m²
(A maximum population equivalent of 6 people)

Distribution Layer: 6.0m wide and 10.5m long with 5 perforated pipes

Septic Tank Sizing
2000 L + (180 x pe) + 2000 + (180 x 6) = 3080 litre
Therefore choose 3800 Litre Klargester Alpha Septic Tank or similar approved.

Table 1. SUDs Pollution Hazard and Mitigation Indices

Type of Contribution Area	Treatment Component	Hazard & Mitigation Index	Total Suspended Solids	Metals	Hydro-carbons
Roads (low Traffic Roads)		Hazard	0.5	0.4	0.4
	Filter Strip	Mitigation Index 1	0.4	0.4	0.5
	Filter Drain	Mitigation Index 2 (Note	0.4	0.4	0.5
	Total Mitigation Provided (Note 3)		**0.6**	**0.6**	**0.75**
Industrial Roofing: Inert Material		Hazard	0.3	0.2	0.05
	Basin	Mitigation Index 1	0.5	0.5	0.6
	Total Mitigation Provided (Note 3)		**0.5**	**0.5**	**0.6**
Other Industrial Site Area		Hazard	0.8	0.8	0.9
	Filter Strip	Mitigation Index 1	0.4	0.4	0.5
	Filter Drain	Mitigation Index 2 (Note	0.4	0.4	0.5
	Basin	Mitigation Index 3 (Note	0.5	0.5	0.6
	Total Mitigation Provided (Note 3)		**0.85**	**0.85**	**>0.95**

Pollution Hazard and Mitigation Indexes Notes:

1. Table 1 shows the total mitigation provided is greater than the Hazard
2. In accordance with the SUDS Manual C753 the entire runoff area has been assessed, the SUDS Manual states that where land use varies across the runoff area, the highest pollution hazard within the area shall be used. In this instance the highest pollution hazard is taken as "Other Industrial Site Area"
3. A factor of 0.5 is used to account for the reduced performance of secondary or tertiary components associated with already reduced inflow concentrations.

Table 2. SUDs Maintenance Plan

Component	Maintenance Schedule	Frequency	Suggested Personel
SUDs Basin	Inlet and Outlet Structures Removal of silt and the clearance of grills, gratings of foliage, vegetation, debris and the like and dispose of off site.	Every 12 months	Farm Operatives
	Control Structures/ Inspection Chambers Removal of silt and debris and dispose of off site.	Every 12 months	Farm Operatives
	Litter Removal Routine collection and removal of litter from the basin and inlet and outlet.	Every 12 months	Farm Operatives
	Grass Cutting The grassed basin is to be cut in April and September.	As noted	Farm Operatives
Filter Drain	Outlet Headwall Structures Manually remove silt, foliage, construction debris, rubbish and the like and dispose off site in a controlled manner.	Every 12 months	Farm Operatives
	Inspection Chambers Manually remove silt, foliage, construction debris, rubbish and the like and dispose off site in a controlled manner. Maintain clear of ground cover and scrub vegetation at least 1m offset around the chambers to ensure that they are readily identifiable and accessible.	Every 12 months	Farm Operatives
	Filter Drain Vegetation Clearance Maintain clear of ground cover and scrub vegetation at least 1m offset at either side of the drain to provide a maintenance corridor, and mitigate rootlets penetrating the filer drain geo-textile.	Every 12 months	Farm Operatives
Filter Strip	Litter Removal Routine collection and removal of litter from the filter strip surface.	As noted	Farm Operatives
	Inspection Surface Inspect filter strip surface to identify evidence of erosion, poor vegetation growth, compaction, ponding, sedimentation and contamination. Inspect silt accumulation rates and stablish appropriate removal frequencies	Every 12 months	Farm Operatives
	Grass Cutting Cut grass, manage other vegetation and remove nuisance plants.	As noted	Farm Operatives

Drainage Impact Assessment Notes:

1. The surface water drainage system to be discharge to the existing ditch to the south of the site.
2. The network has been designed to accommodate no flooding up to and including the 200year event + 30% Climate Change.
3. In accordance with the SUDs manual C753, the simple index approach has been utilised to ascertain the total potential pollution hazard.
4. Treatment has been provided as per the mitigation indices from Table 26.3 of the SUDs manual C753. The mitigation provided equals or exceeds the potential pollution index (See Table 1).
5. Mitigation treatment is provided through filter Strips, filter drains and a basin for the yard area and roof.
6. Mitigation treatment is provided through filter strip and filter drain for the access track.
7. Attenuation provided to control the discharge from the development to Greenfield Runoff (QBar) of 5.38 l/s.
8. A HR Wallingford Storage estimation assessment of the potential attenuation volume required has been carried out using IH124 Method and the volume required assessed as 580 m³.
9. A review of the Water Environment (Controlled Activities) (Scotland) Regulations 2011 demonstrates that this development shall not require SEPA licence to discharge, as the surface water is installed and maintained in accordance with GBR 18, 19, 20 and 21 of the CAR Regulations.
10. There are no Scottish Water foul, surface water or combined sewers in the vicinity of the proposal.
11. Office facility WC and associated facilities foul drainage to be discharged to septic tank with outfall to drainage field sized in accordance with BS 6297:2007.
12. Building roof area water to be collected and discharged directly to the SUDs basin and attenuation provided within the basin to Greenfield Run Off equivalent.
13. Farm yard area surface water to be collected in filter strips/filter drains and discharged to the SUDs basin and with attenuation provided within the basin to Greenfield Run Off equivalent.

Revision	Date	Description	Initials
P03	12.05.20	Mound Filter Updated, Foul Water Sewer Updated and Reed Bed Added	LG
P02	30.01.20	Drainage Updated to Suit Latest Site Layout	LG
P01	23.01.20	For client issue	LG

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Project Name
Farm Relocation
Balavil
Client
Balavil Estate

Title
Proposed Drainage Plan & SUDs
PPP Condition 2-M and 2-N

N. Point | Scale 1:500 | Bar Scale 0 12.5 25m (1:500)

Date 23.01.20 | Paper Size A1 | Quality Assurance ISO 9001:2015, BS8 UKAS Certificate GB02/54539

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Status
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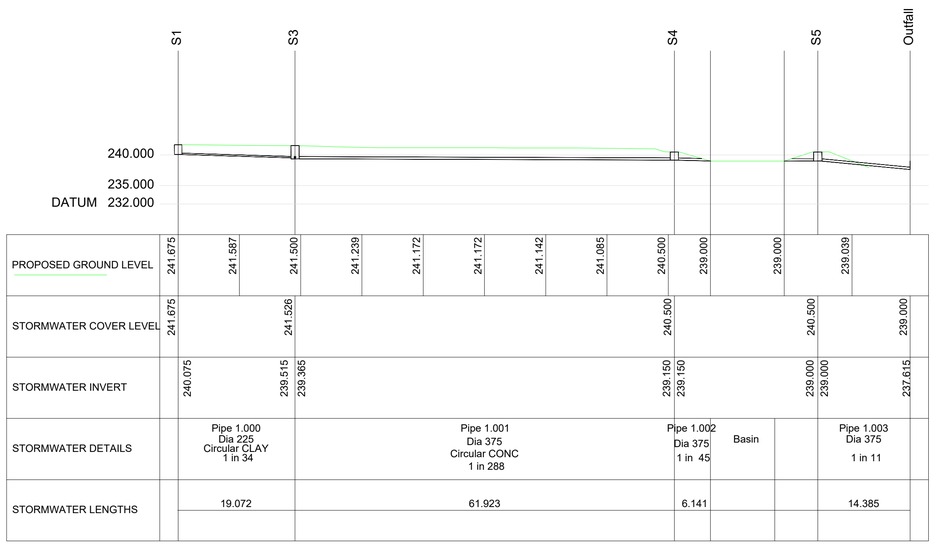
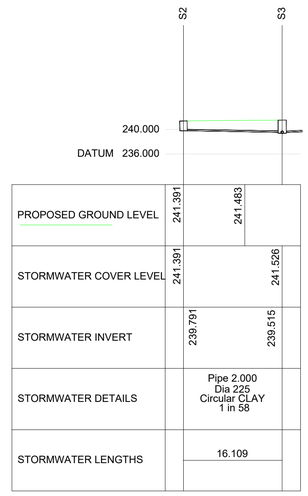
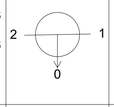
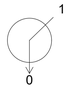
Project No 50499-401 | Drawing No | Revision P03





MANHOLE SCHEDULE

Sheet 1 of 1

Manhole Number / Coordinates	Cover Level / Depth To Soffit	Connections	Pipe Code	Pipe Inverts	Pipe Diams Inv-soff	Manhole Size	Types Manhole	Types Cover
S1 E. 278225.001 N. 802071.448	241.675 1.375		0 1.000	240.075	225	1200	B	Unspec
S2 E. 278243.378 N. 802041.448	241.391 1.375		0 2.000	239.791	225	1200	B	Unspec
S3 E. 278234.949 N. 802055.176	241.526 1.786		1 2.000 2 1.000 0 1.001	239.515 239.515 239.365	225 225 375	1350	B	Unspec
S4 E. 278181.595 N. 802023.747	240.500 0.975		1 1.001 0 1.002	239.150 239.150	375 375	1350	B	Unspec
S5 E. 278176.124 N. 802000.977	240.500 1.125		1 1.002 0 1.003	239.000 239.000	375 375	1350	Control Chamber	Unspec

STORM Network 1

Pipe Code	Diameter (mm)	Gradient (1:)	Pipe Length	Upstream Manhole Number	Upstream Manhole Invert	Upstream Manhole Cover	Downstream Manhole Number	Downstream Manhole Invert	Downstream Manhole Cover
1.000	225	34	19.072	S1	240.08	241.68	S3	239.52	241.53
1.001	375	288	61.923	S3	239.37	241.53	S4	239.15	240.50
1.002	375	156	23.418	S4	239.15	240.50	S5	239.00	240.50
1.003	375	11	15.070	S5	239.00	240.50	S_	237.61	239.00
2.000	225	58	16.109	S2	239.79	241.39	S3	239.52	241.53

Revision	Date	Description	Initials
P01	23.01.20	For client issue	LG

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Project Name
Farm Relocation
Balavil
Client
Balavil Estate

Title
Proposed Drainage
Longitudinal Sections
PPP Condition 2-M and 2-N

N. Point
Scale 1:500
Scale
Bar Scale 0 12.5 25m
1:500

Date 23.01.20
Paper Size A1
Quality Assurance ISO 9001:2015 SGS UKAS Certificate GB02/54539
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Status
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Project No 50499-402
Drawing No
Revision P01

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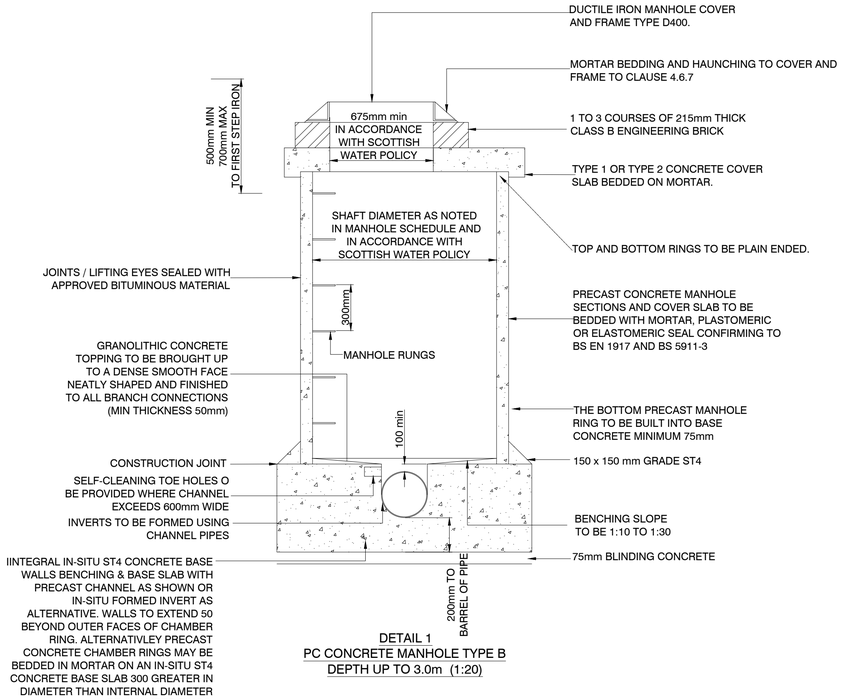
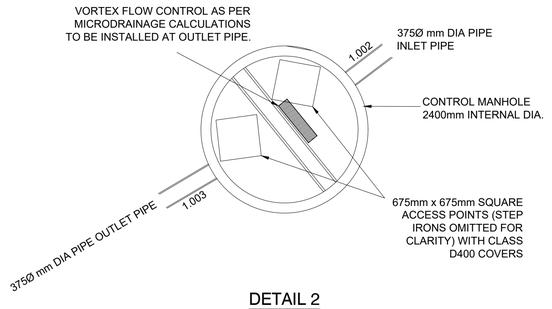
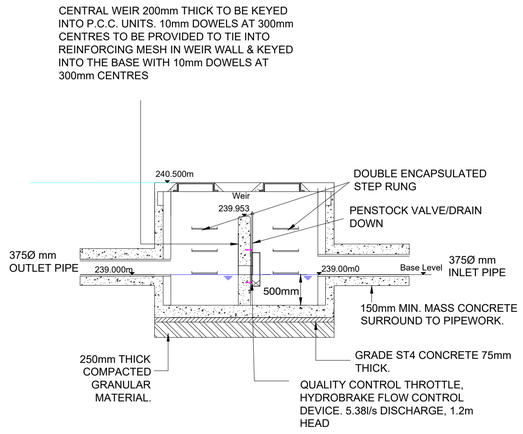


DETAIL 1
PC CONCRETE MANHOLE TYPE B
DEPTH UP TO 3.0m (1:20)



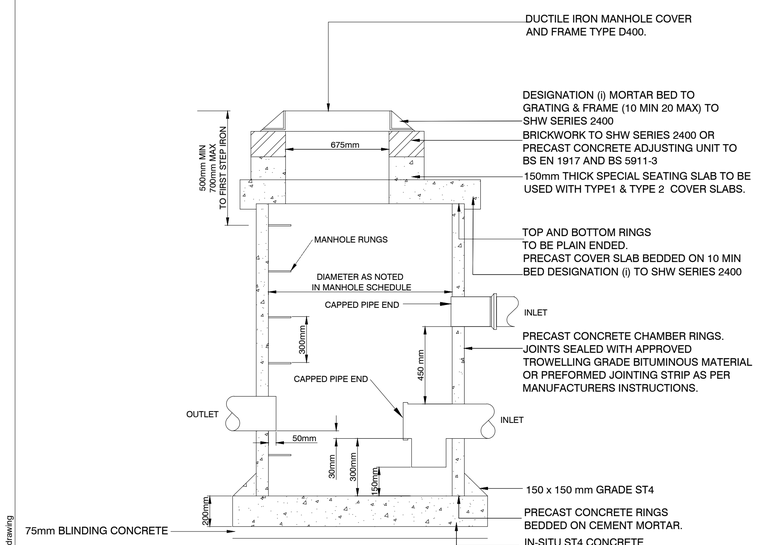
DETAIL 2
CONTROL CHAMBER MHS6 - PLAN (1:50)



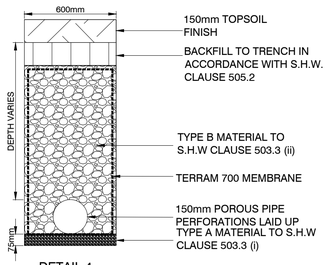
CONTROL MANHOLE MHS6 SECTION
(1:50)

Notes:

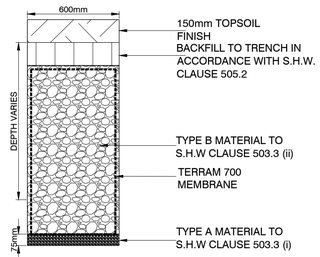
1. Refer to "Sewers for Scotland, 4th Edition" for typical details of manholes with depths from cover level to soffit of pipe not exceeding 6m. No significant departure from these shall be made without the approval of Highland Council. Types D&F need the agreement of Scottish Water. Manholes should be designed and constructed in accordance with BS EN 752-3.
2. Manhole diameter to be as follows:
   1200mmØ (Pipe Ø up to 375mm.)
   1500mmØ (Pipe Ø > 375mm up to 700mm.)
   1800mmØ (Pipe Ø > 750mm up to 900mm.)
3. Manhole construction to be in accordance with "Sewers for Scotland, Fourth Edition", (SFS4).
4. Manhole covers and frames to be in accordance with SFS4 sub-section 5.2.30.
5. Rocker pipes shall be provided at entry to and exits from manholes. Their length shall be as shown in the Table in sub-section 5.6.6 of SFS4.
6. Where step rungs and ladders are to be used top-step rungs are to be located not less than 500mm and not greater than 700mm from the finished manhole cover level with a minimum of two courses of brickwork.
7. Chambers more than 450mm in depth have to have one or more step rungs or toe holes and 25mm diameter solid bar handrail to be provided to the benching.
8. Where no step rungs are to be used, there shall be between two and four courses of brickwork under cover.
9. Refer to SFS4 sub-section 2.20.7 for minimum clear access opening sizes and requirements for fittings.
10. Pipes of different diameters entering manholes shall be installed with soffits at the same level.
11. Clause numbers to the Specification for Highway Works (S.H.W.)
12. Pipe materials shall be in accordance with part 4 Sewers for Scotland 4th Edition.
13. The use of perfect manhole or similar precast base units shall be precluded without the express consent of the engineer.



DETAIL 3
FILTER TRENCH CATCHPIT DETAIL
SCALE (1:20)

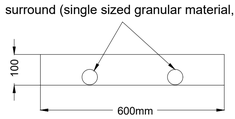


DETAIL 4
FILTER DRAIN
SCALE (1:20)



DETAIL 5
EMBANKMENT FILTER TRENCH
SCALE (1:20)

2 No. 50mmØ Perforated Pipes with filter material surround (single sized granular material, 14mm no Limestone)



DETAIL 6
MAIN "LOW FLOW" CHANNEL
SCALE 1:10

Revision	Date	Description	Initials
P01	23.01.20	For client issue	LG

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Project Name
Farm Relocation
Balavil
Client
Balavil Estate

Title
Proposed Drainage
Drainage Details
PPP Condition 2-M and 2-N

N. Point | Scale 1:500 | Bar Scale 0 12.5 25m (1:500)

Date 23.01.20 | Paper Size A1 | Quality Assurance ISO 9001:2015 SGS UKAS Certificate GB02/54539

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Status
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Project No 50499-403 | Drawing No | Revision P01

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Mound Filter System

Calculations to BRE Digest No. 478, Mound Filter Systems for the Treatment of Domestic Wastewater

Vp from percolations text results = 186.9

Minimum Basal Area

At = P x Vp x 0.25

P =	Population Equivalent	6
Vp =	Percolation value of the native soil (s/mm)	186.9
At =	Area	280.3 m²

Minimum Distribution Layer Area

Ad = P x Vf x 0.25

P =	Population Equivalent	6
Vf =	Percolation value of filter material (s/mm)	35
Ad =	Distribution layer area (m²)	52.5 m²

Length of Pipework within Distribution Layer

Ad =		52.5
Pipes =	Adopt 5 pipes	5
Length =	Length of each pipe	10.5 m

Assuming 6.0m distribution layer width.

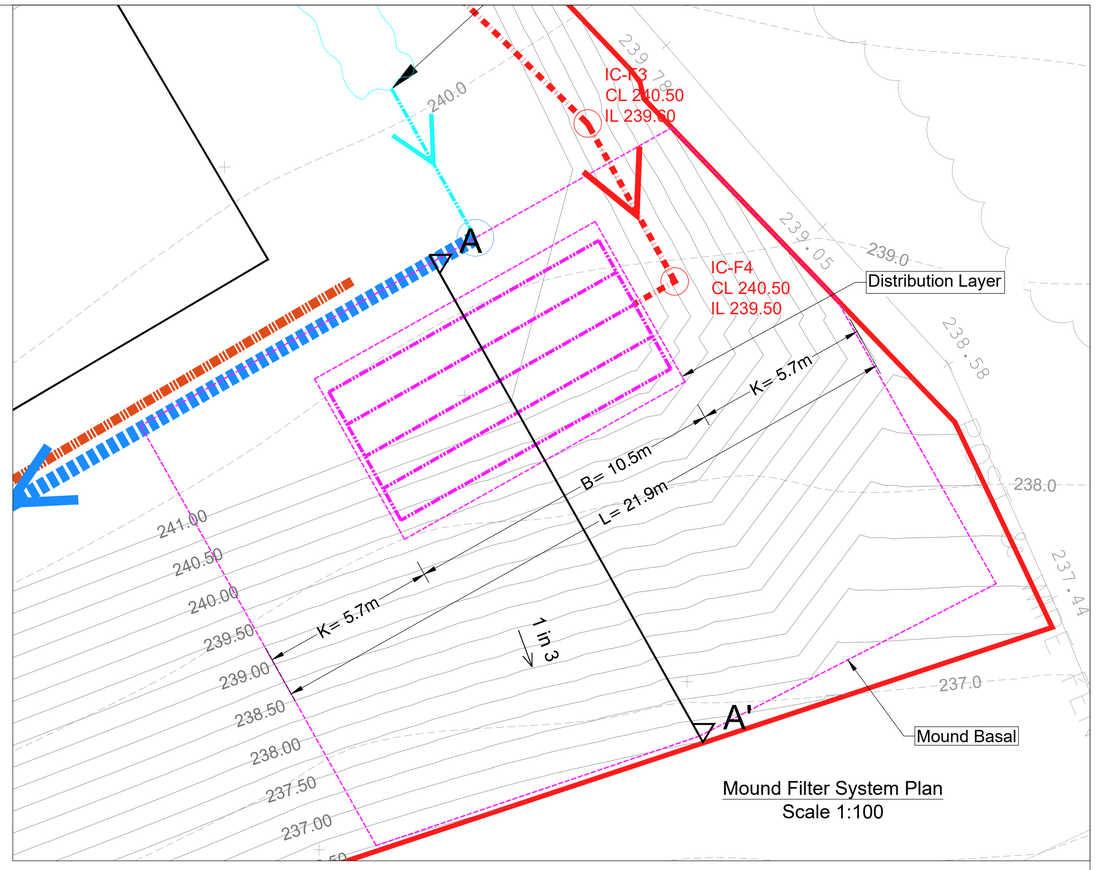
Therefore Width between pipes 1.2 m

Therefore distribution layer area = 10.5 m x 6.0m = 63.00 m²

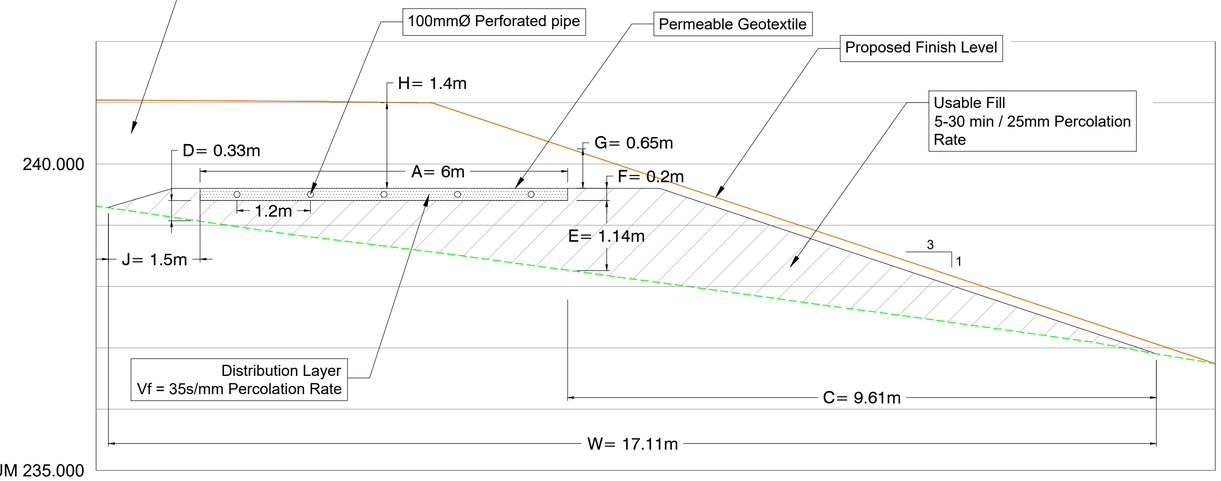
Resultant Mound Dimension

The resultant dimension meet the critical dimension for distribution layers bed as per BRE 478 - Fig 14 and Figure.

A =	Distribution layer width	6.00 m
B =	Distribution layer length	10.50 m
C =	Downslope taper	9.61 m
D =	Depth of filter material at the upslope edge	0.33 m
E =	Depth of filter material at the downslope edge	1.14 m
F =	Depth of gravel in the distribution layer	0.20 m
G =	Depth of the cover at the upslope and downslope	0.30 m
H =	Depth of cover at the centre of the distribution layer	1.40 m
J =	Upslope taper	1.50 m
K =	Sideslope taper	5.75 m
L =	Total length of mound [B+2K]	21.90 m
W =	Total Width of the Mound [A+C+J]	17.11 m
X =	Total height of mound H+J+[(D+E)/2]	2.34 m
Ad =	Distribution Layer Area	63.0 m²
At =	Mound Basal Area (L X w)	371.5 m²
X =	Height	2.3 m²



Mound Filter System Plan
Scale 1:100



Chainage	0.000	2.000	4.000	6.000	8.000	10.000	12.000	14.000	16.000	18.000	18.269
Existing Ground Level	239.316	239.022	238.749	238.499	238.226	237.955	237.680	237.410	237.131	236.787	236.741
Proposed Level	241.051	241.034	241.018	241.002	240.797	239.987	239.178	238.398	237.622	236.845	236.741

Mound Filter Cross Section A-A'
Scale H 1:50
V 1:50

Notes

1. The area required for the mound shall be fenced to avoid traffic and constructions. This will prevent disturbance, scalping or compaction of the mound.
2. The septic and infiltration system shall be inspected annually.

KEY

- Site Boundary
- Topographical Survey Contours (238.0)
- 0.50m Proposed Finished Contour (239.50)
- Proposed Foul Water Sewer
- Proposed Mound Filter System Pipe
- Proposed Filter Strip
- Proposed Filter Drain
- Proposed Reed Bed System

Revision	Date	Description	Initials
P02	14.05.20	Proposed finish level indicated in the cross section	LG
P01	-	For client issue	-

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Project Name
Farm Relocation
Balavil
Client
Balavil Estate

Title
Proposed Mound Filter System
PPP Condition 2-M and 2-N

N. Point | Scale 1:500 | Bar Scale 0 12.5 25m (1:500)

Date 07.05.20 | Paper Size A1 | Quality Assurance ISO 9001:2015 SGS UKAS Certificate GB02/54539

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Status
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Project No 50499-404 | Drawing No | Revision P02

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Wash Bay Reed Bed Sizing Calculations

Sizing based on the Recommendations from BRE Publication 'Reed Beds for the Treatment of Domestic Wastewater'

Recommended size of reed bed = 5m² / PE

Calculation of Flow

Pressure washer with a flow rate of 10 litres per minute.

Assume 5 minutes per wash

Therefore flow = 10 x 5 = 50 litres per wash

Hose with a flow rate of 20 litre per minute

Assume 5 minutes per wash

Therefore flow = 20 x 5 = 100 litre per wash

Therefore size for hose wash

Assume 3 Wash per day

Therefore flow per day = 3 x 100 = 300 litre per day

Calculation of Population Equivalent

Flow for one person = 180 litre per day

Therefore PE equivalent = 300/180 = 1.7 = 2 Persons

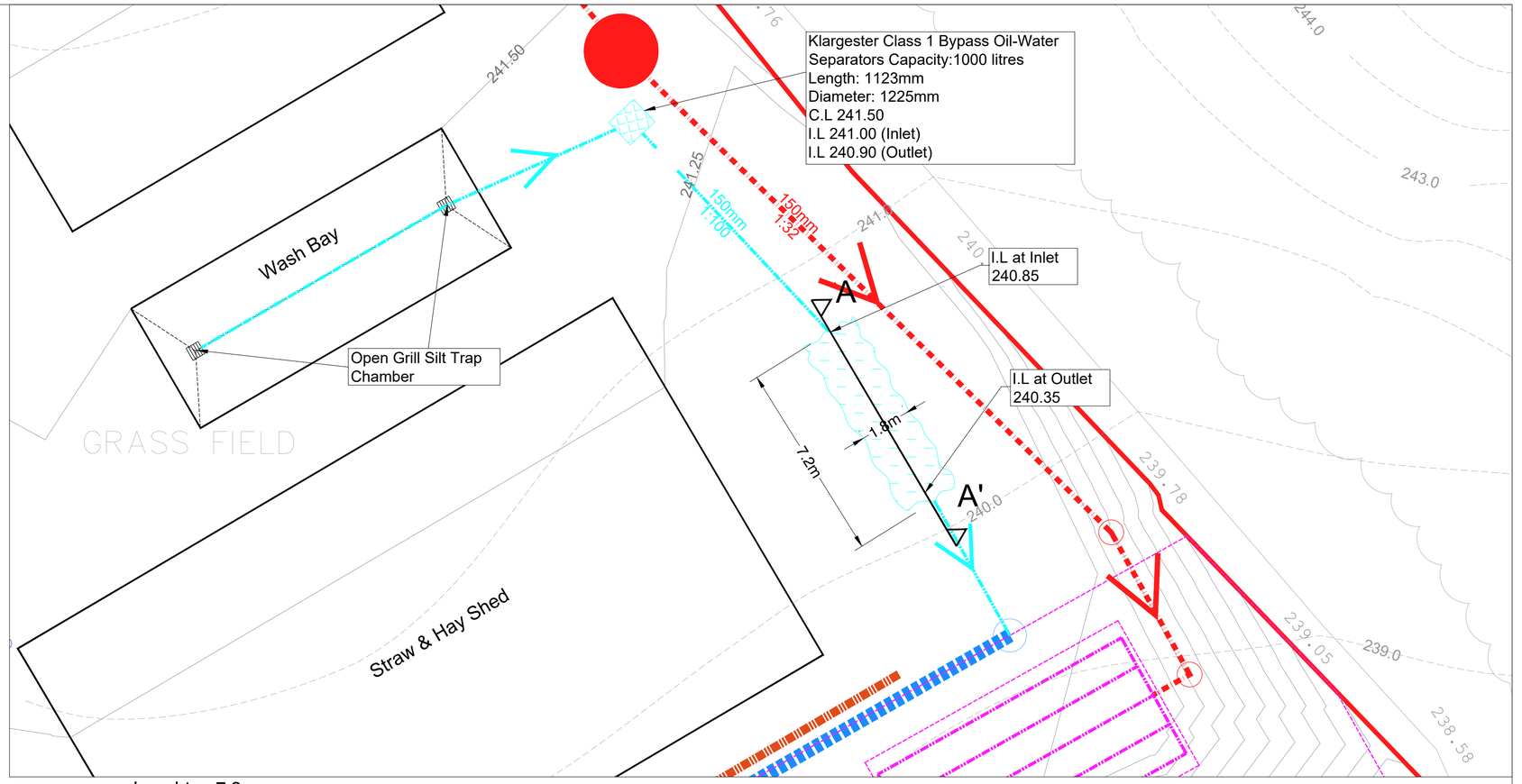
Sizing of Reed Bed

Recommendation Size = 5m² / PE

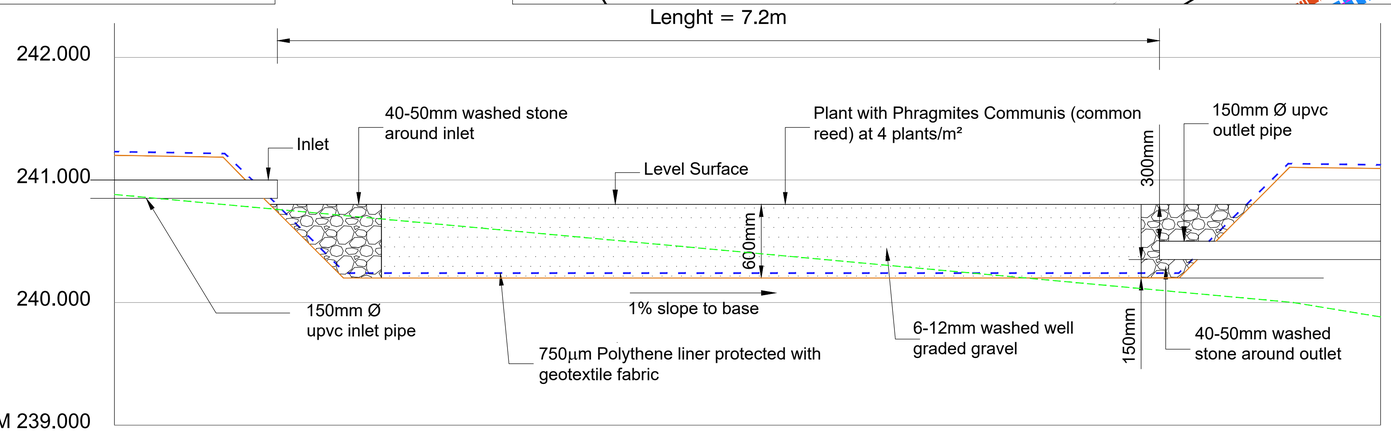
Therefore minimum reed bed area = 5 x 2 = 10m²

Recommended length to width ratio for a reed bed 4:1 for PE ≤ 30

Therefore adopt reed bed 7.2m x 1.8m (13 m²)



Reed Bed Plan
Scale 1:100



Chainage	0.000	2.000	4.000	6.000	8.000	10.000	10.334
Existing Ground Level	240.882	240.698	240.515	240.332	240.149	239.938	239.882
Proposed Level	241.202	241.169	241.147	241.134	241.118	241.098	241.094

Reed Bed Cross Section A-A'
Scale H 1:25
V 1:25

KEY

- Site Boundary
- Topographical Survey Contours (238.0)
- 0.50m Proposed Finished Contour (239.50)
- Proposed Foul Water Sewer
- Proposed Mound Filter System Pipe
- Proposed Septic Tank
- Proposed Filter Drain
- Proposed Reed Bed System

Revision	Date	Description	Initials
P01	-	For client issue	-

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Project Name
Farm Relocation
Balavil
Client
Balavil Estate

Title
Proposed Reed Bed
PPP Condition 2-M and 2-N

N. Point
Scale 1:500
Bar Scale 0 500 1000mm 1:25

Date 23.01.20
Paper Size A1
Quality Assurance ISO 9001:2015 SGS UKAS Certificate GB02/54539
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Status
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Project No 50499-405
Drawing No
Revision P01

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KEY

- Site Boundary
- Proposed Stockproof Post & Wire Fencing
- Proposed Gate
- Proposed Bird Box Location (swift)
- Proposed Bat Box Location

Notes:

1. For external appearance of buildings (elevations and cross sections) refer to Algo drawings E18-062/PL_01 to PL_06.

Note: Please do not scale from this drawing

Revision	Date	Description	Initials
P02	14.05.20	Key updated	LG
P01	17.02.20	For client issue	LG

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Project Name
Farm Relocation
Balavil

Client
Balavil Estate

Title
Proposed Bird and Bat Box Locations
PPP Condition 2-P

N. Point

Scale
1:250
Scale

Bar Scale
0 5 10m
1:250

Date
23.01.20

Paper Size
A1

Quality Assurance
ISO 9001:2015
SGS UKAS Certificate GB02/54539

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Drawn By
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Checked by
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Status
FOR APPROVAL

Project No
50499

Drawing No
-603

Revision
P02

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Rev.	Date	Descrption	App'd

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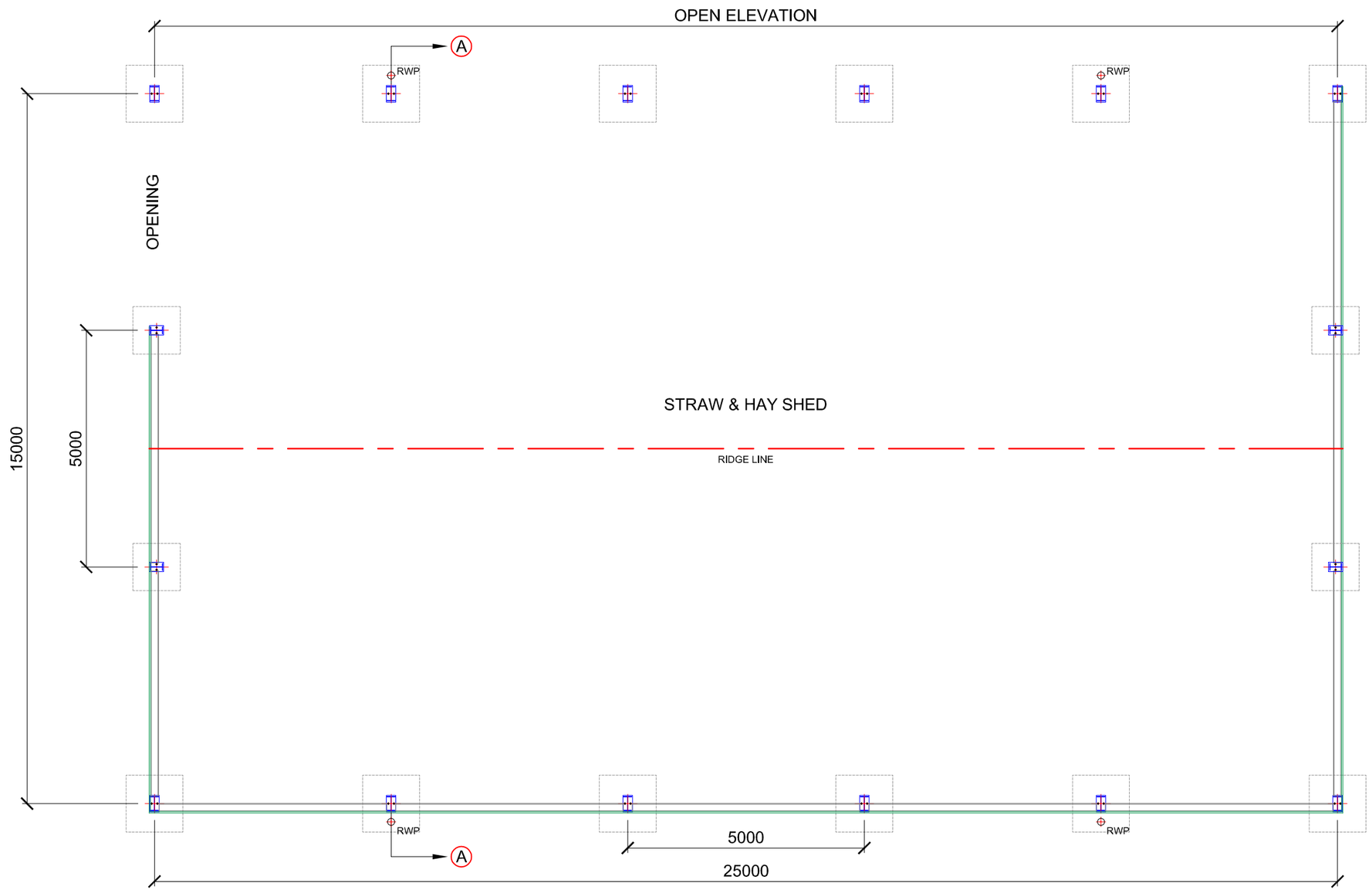

EQUIPMENT / TRACTOR BUILDING - FLOOR PLAN
SCALE - 1:100

SCALE BAR - METRES
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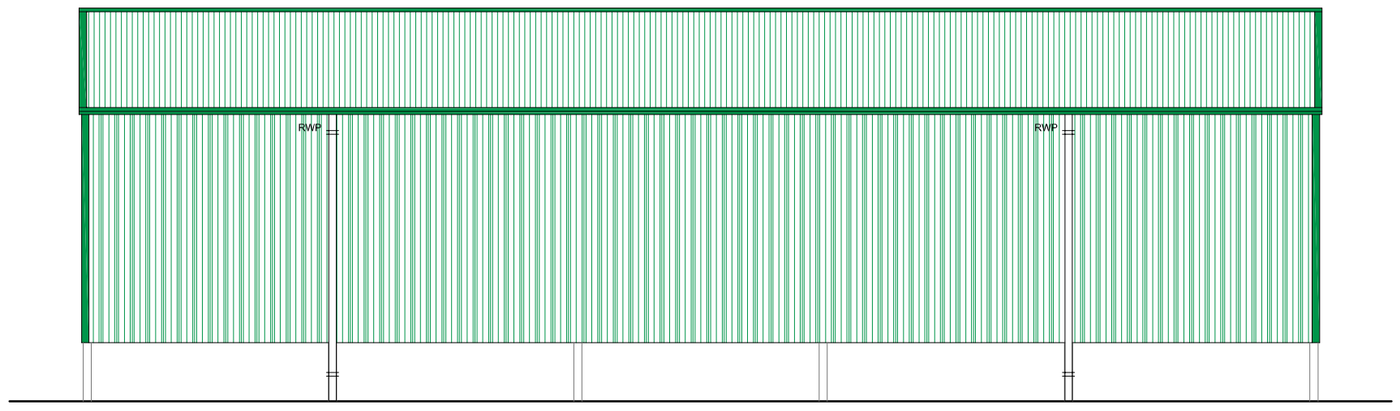

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SCALE - 1:125

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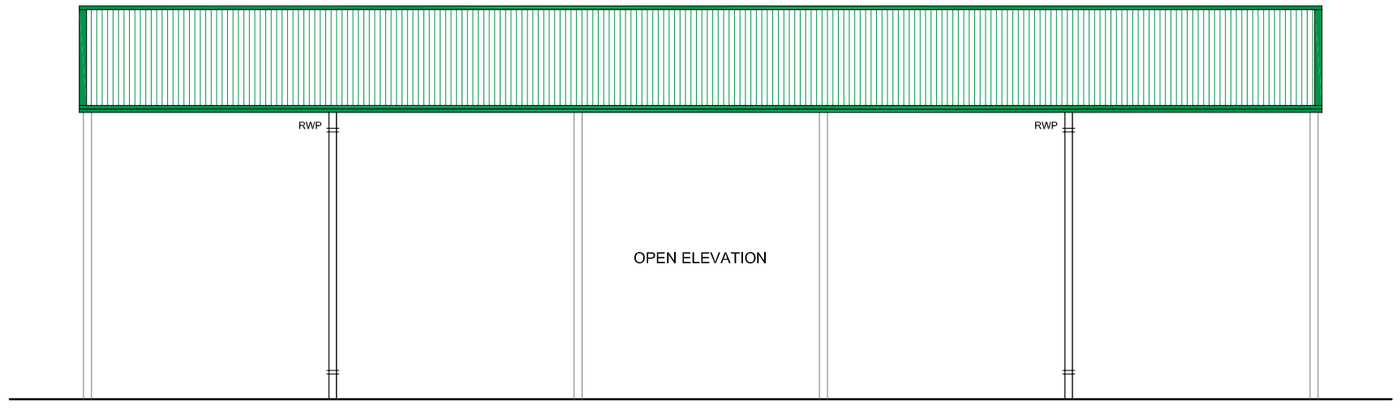

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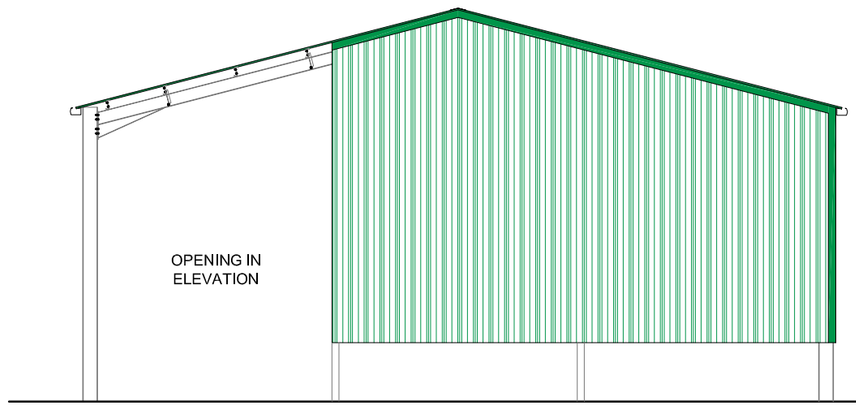

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SCALE - 1:100

SCALE BAR - METRES
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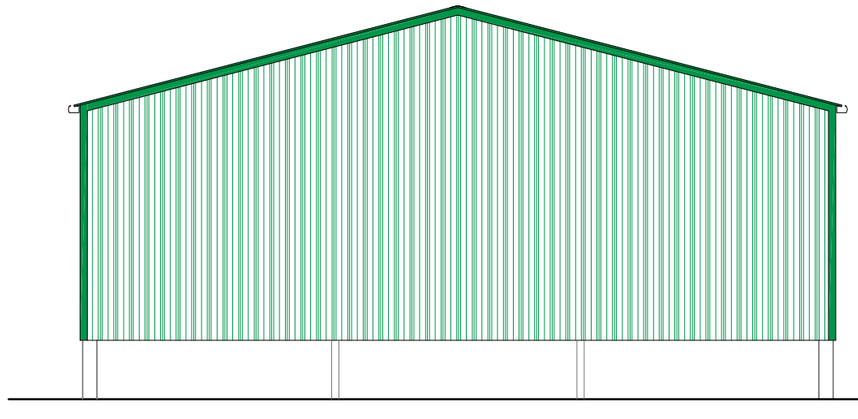

EAST ELEVATION
SCALE - 1:100

SCALE BAR - METRES
0 1 2 3 4 5

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BL	SF	
Drawing Sheet Size	Scale	Date
A2	AS SHOWN	04.02.2020

Project Title
PROPOSED AGRICULTURAL DEVELOPMENT AT BALAVIL ESTATE, KINGUSSIE, INVERNESS-SHIRE

Drawing Title
STRAW & HAY STORAGE BUILDING FLOOR PLAN & ELEVATIONS

Project Number
E18-062

Drawing Number	Revision
PL_05	**-**

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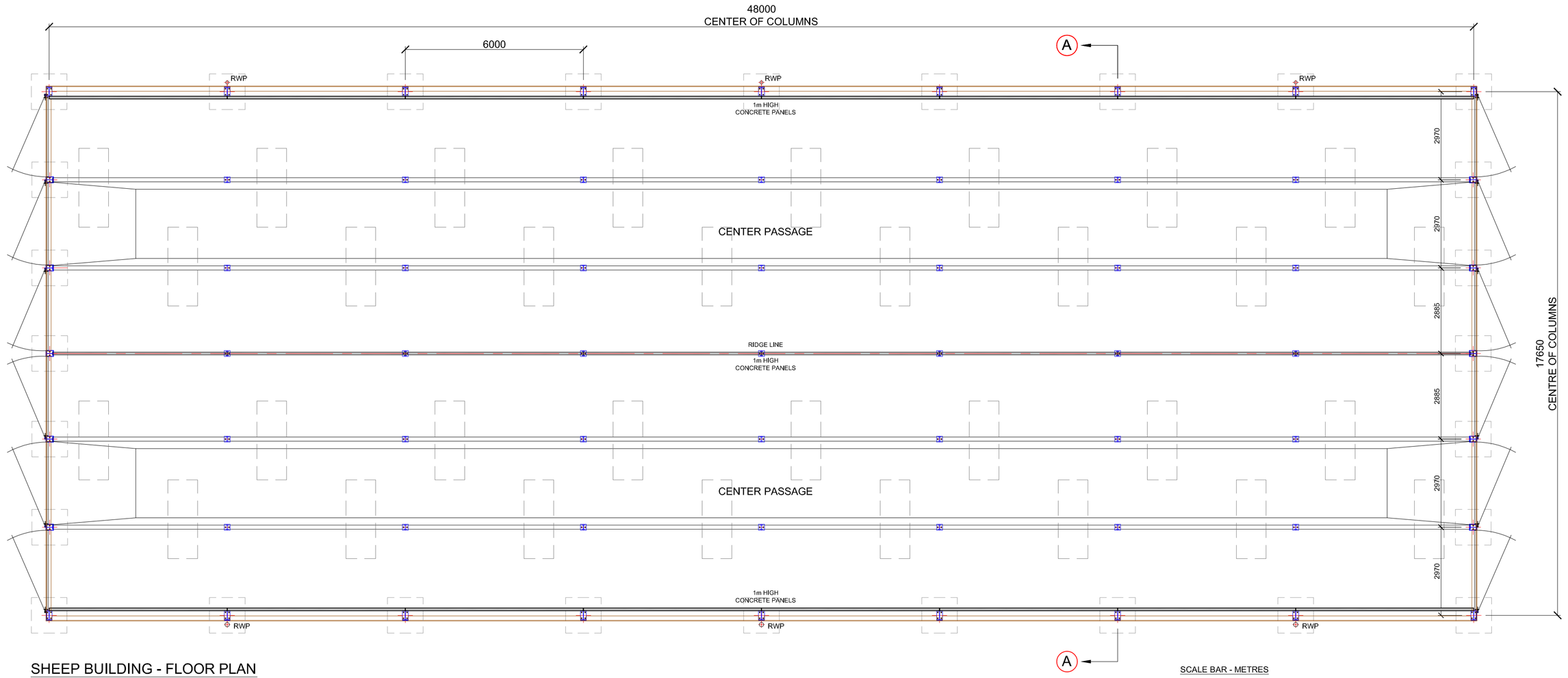
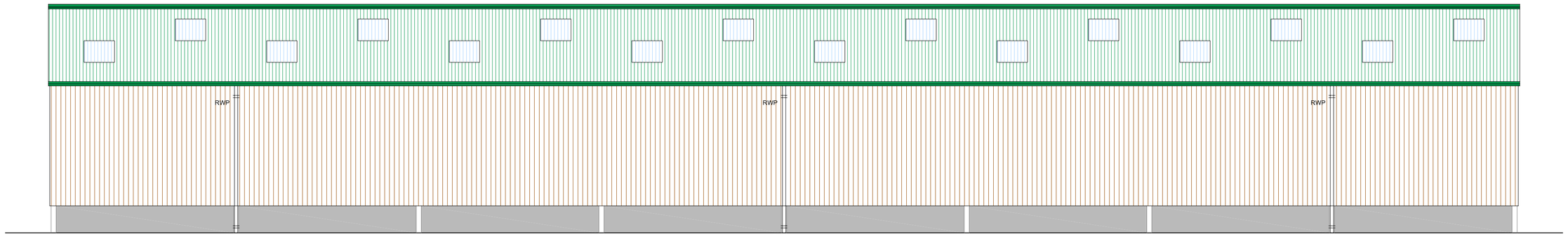
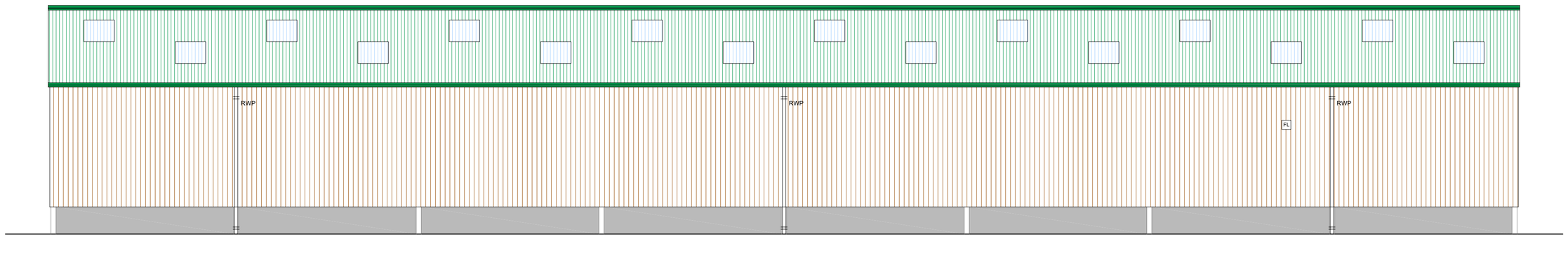
Rev.	Date	Description	App'd
A	17.02.2020	EXTERNAL LIGHTING ADDED	



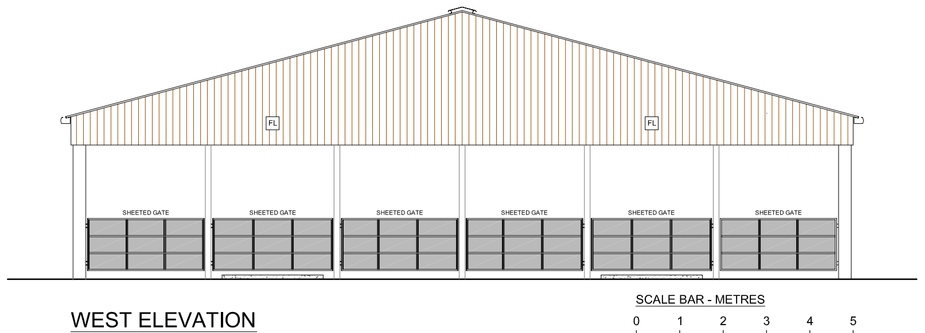
SHEEP BUILDING - FLOOR PLAN
SCALE - 1:100



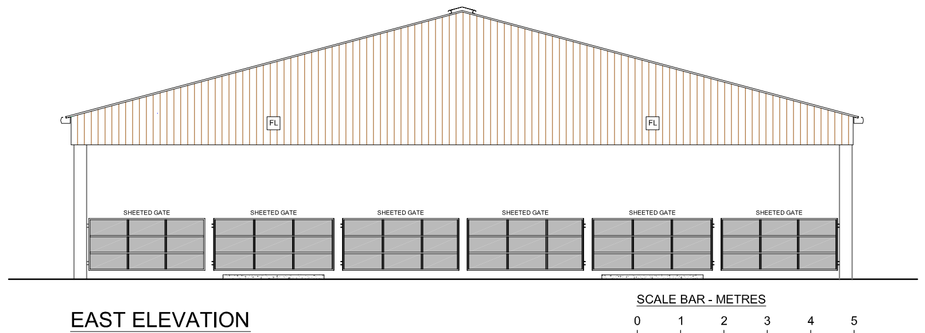
SOUTH ELEVATION
SCALE - 1:100



NORTH ELEVATION
SCALE - 1:100



WEST ELEVATION
SCALE - 1:100



EAST ELEVATION
SCALE - 1:100

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BL	SF	
Drawing Sheet Size	Scale	Date
A1	AS SHOWN	04.02.2020

Project Title
PROPOSED AGRICULTURAL DEVELOPMENT AT BALAVIL ESTATE, KINGUSSIE, INVERNESS-SHIRE

Drawing Title
SHEEP BUILDING FLOOR PLAN & ELEVATIONS

Project Number
E18-062

Drawing Number	Revision
PL_01	**A**

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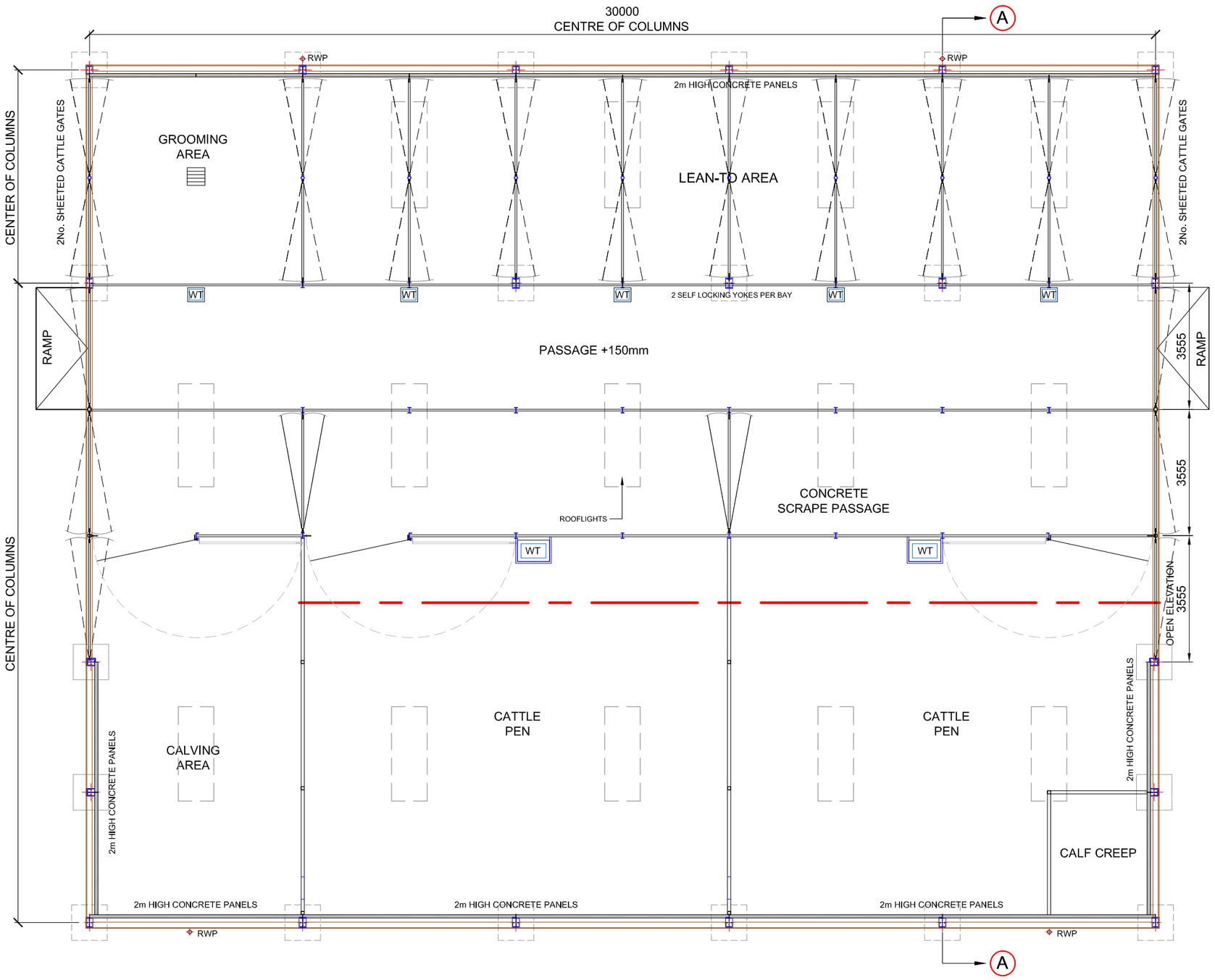

CATTLE BUILDING - FLOOR PLAN
SCALE - 1:125

SCALE BAR - METRES
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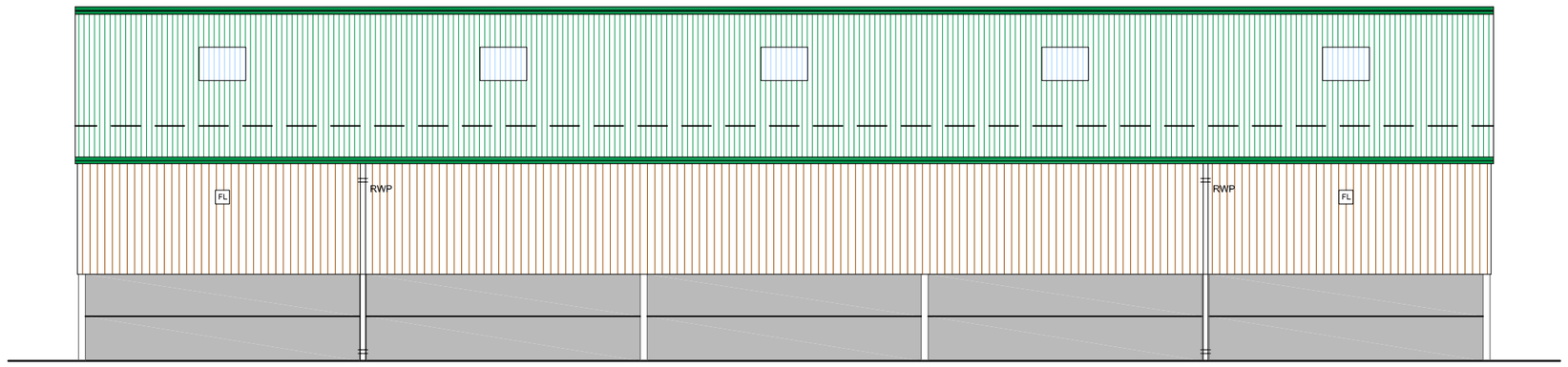

NORTH ELEVATION
SCALE - 1:100

SCALE BAR - METRES
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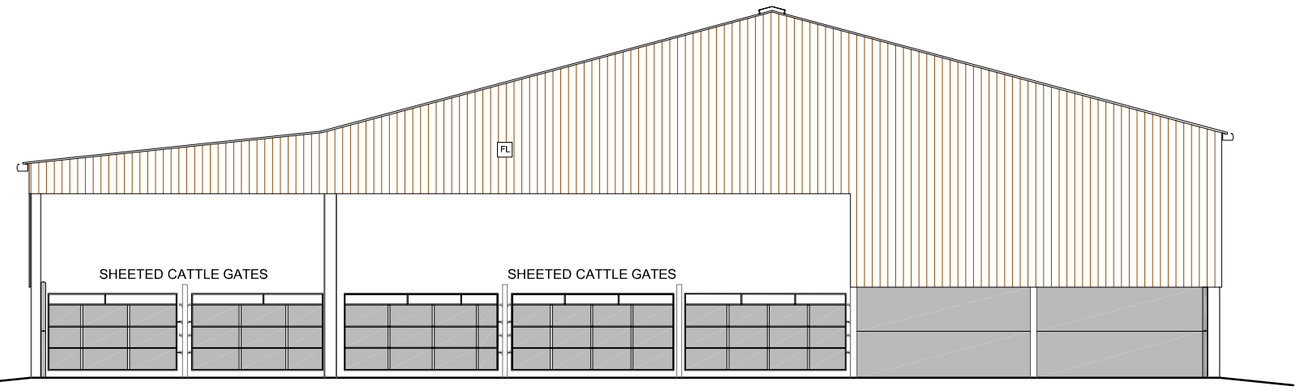

WEST ELEVATION
SCALE - 1:125

SCALE BAR - METRES
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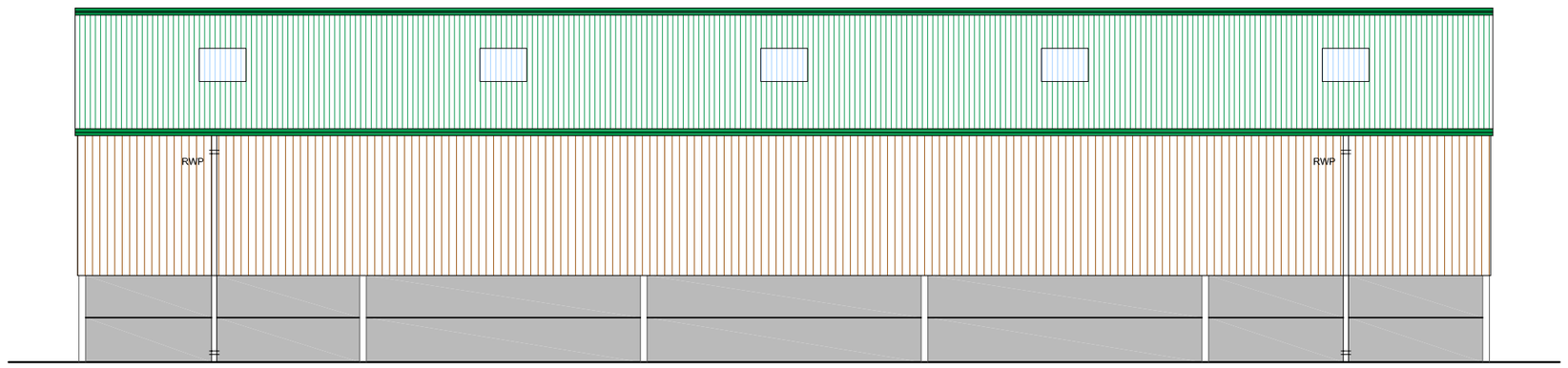

SOUTH ELEVATION
SCALE - 1:125

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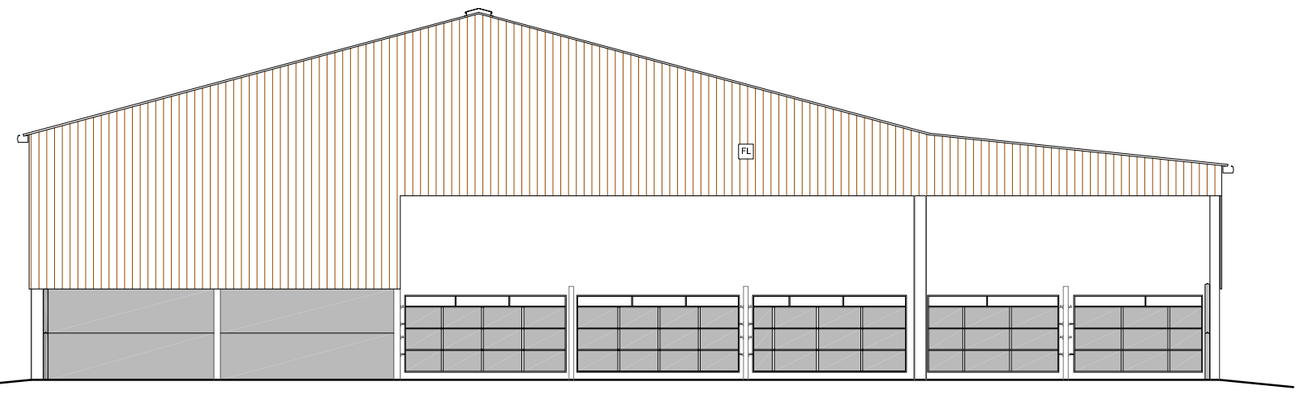

EAST ELEVATION
SCALE - 1:125

SCALE BAR - METRES
0 1 2 3 4 5

Rev.	Date	Description	App'd
A	17.02.2020	EXTERNAL LIGHTING ADDED	

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Drawing Sheet Size	Scale	Date
A2	AS SHOWN	04.02.2020

Project Title
PROPOSED AGRICULTURAL DEVELOPMENT AT BALAVIL ESTATE, KINGUSSIE, INVERNESS-SHIRE

Drawing Title
CATTLE BUILDING FLOOR PLAN & ELEVATIONS

Project Number
E18-062

Drawing Number	Revision
PL_02	**A**

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Rev.	Date	Descrption	App'd
A	17.02.2020	EXTERNAL LIGHTING ADDED	

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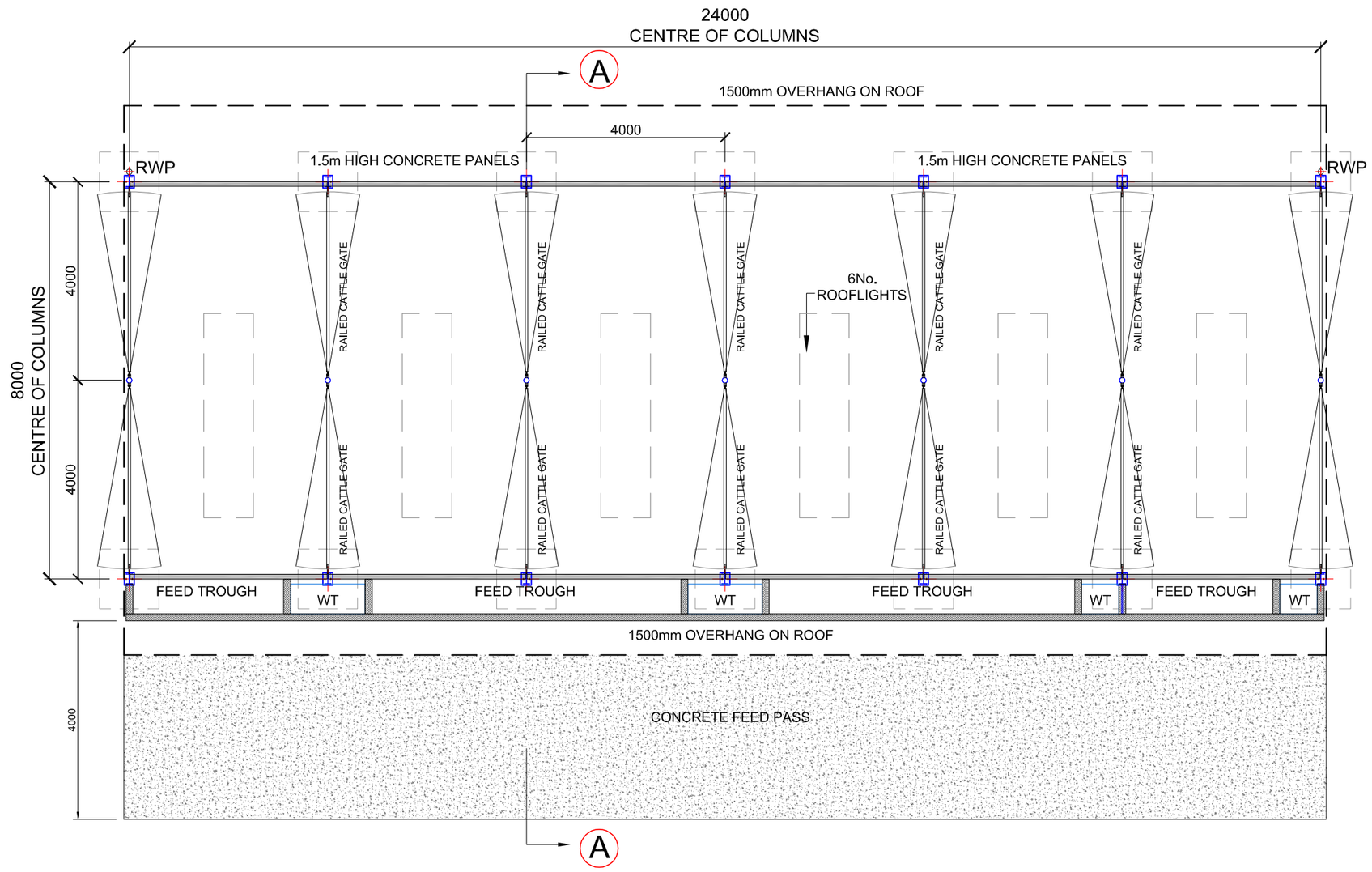

BULL BUILDING - FLOOR PLAN
SCALE - 1:100

SCALE BAR - METRES
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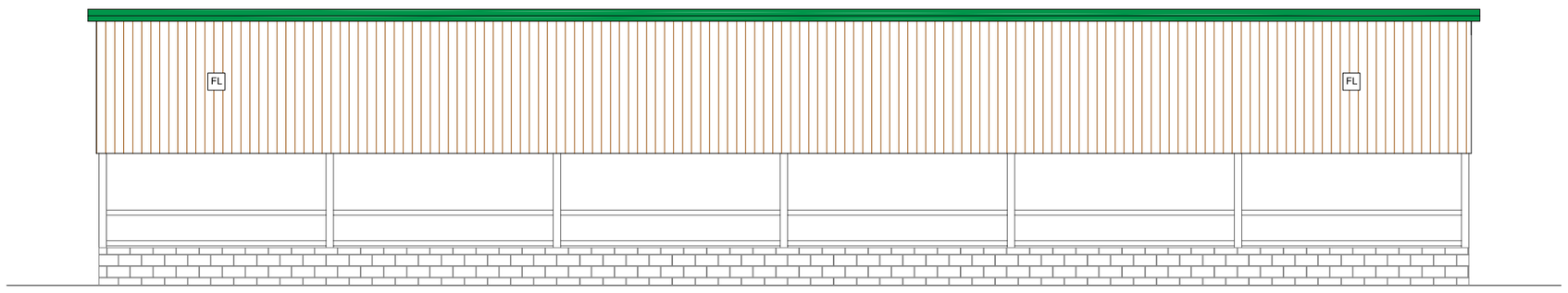

SOUTH ELEVATION
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SCALE BAR - METRES
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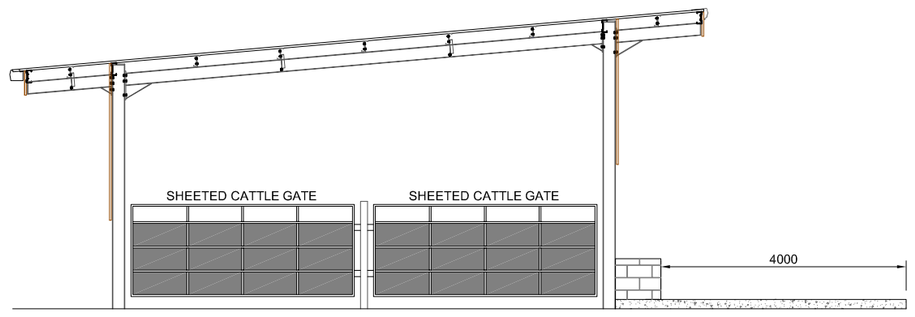

WEST ELEVATION
SCALE - 1:100

SCALE BAR - METRES
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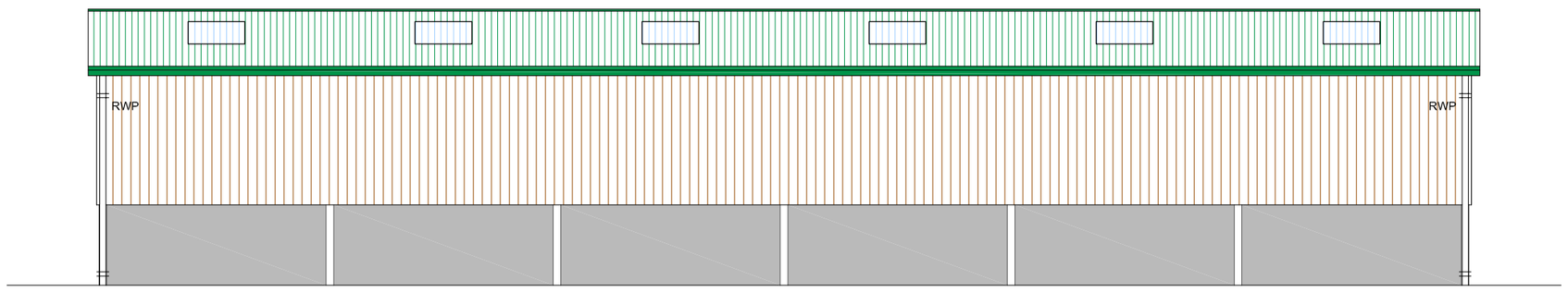

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SCALE BAR - METRES
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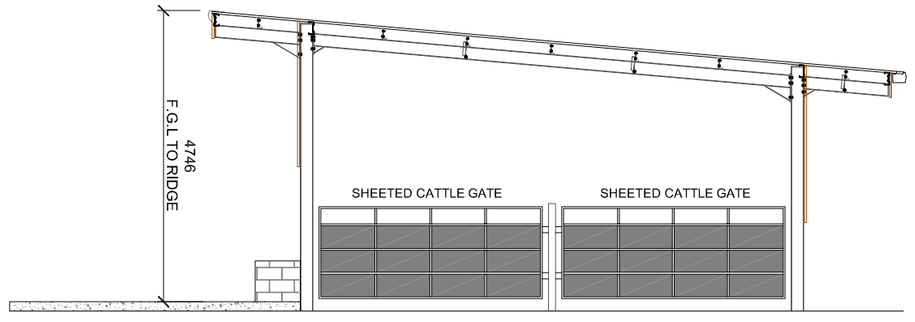

EAST ELEVATION
SCALE - 1:100

SCALE BAR - METRES
0 1 2.5 5

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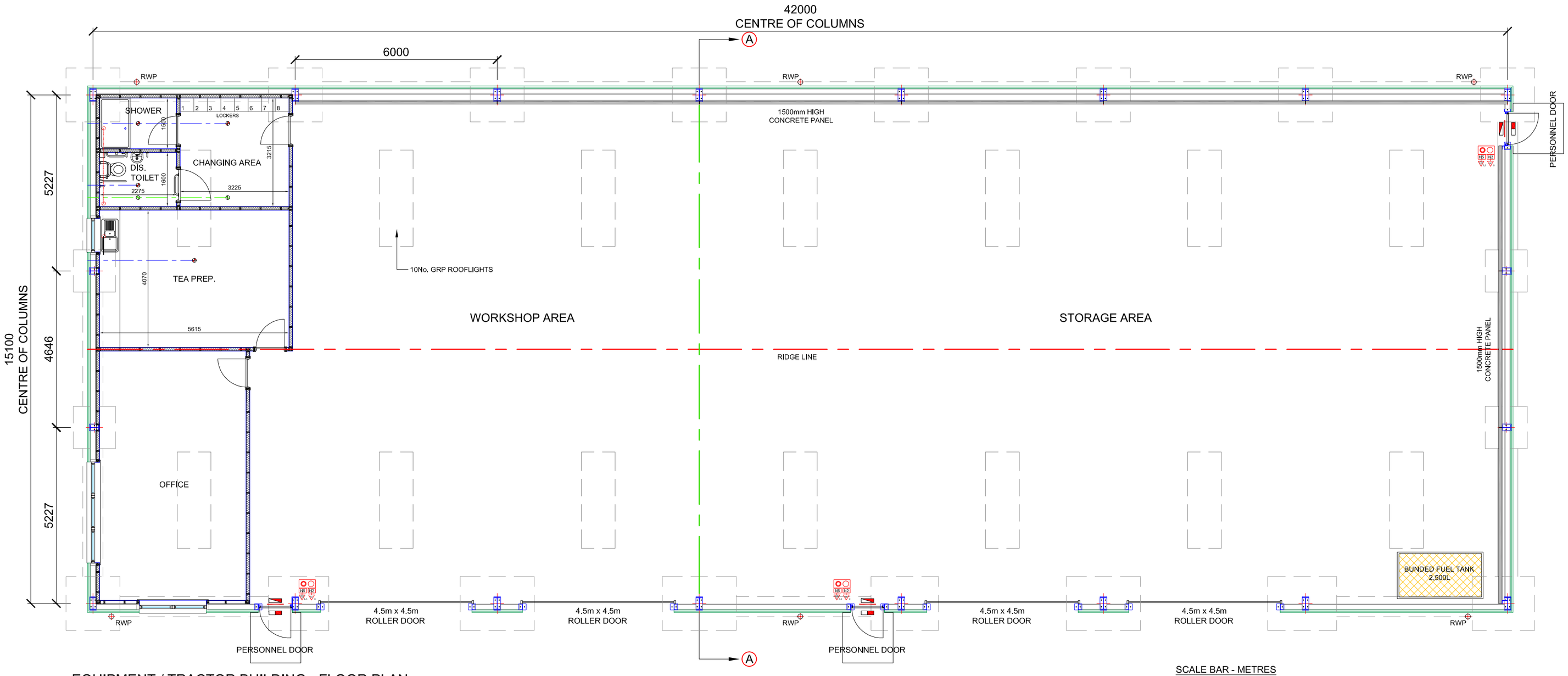
Drawing Sheet Size	Scale	Date
A2	AS SHOWN	04.02.2020

Project Title
PROPOSED AGRICULTURAL DEVELOPMENT AT BALAVIL ESTATE, KINGUSSIE, INVERNESS-SHIRE

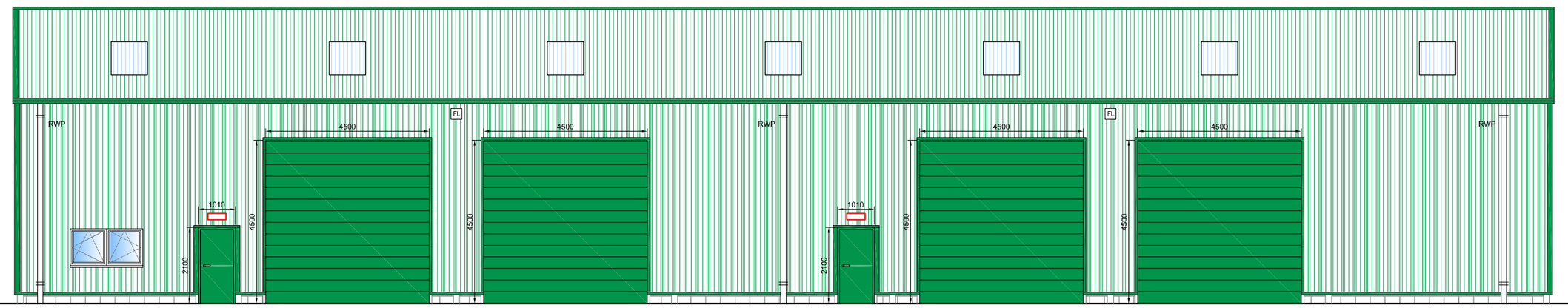
Drawing Title
BULL BUILDING FLOOR PLAN & ELEVATIONS

Project Number
E18-062

Drawing Number	Revision
PL_03	**A**



EQUIPMENT / TRACTOR BUILDING - FLOOR PLAN
SCALE - 1:100



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SCALE - 1:125

SCALE BAR - METRES
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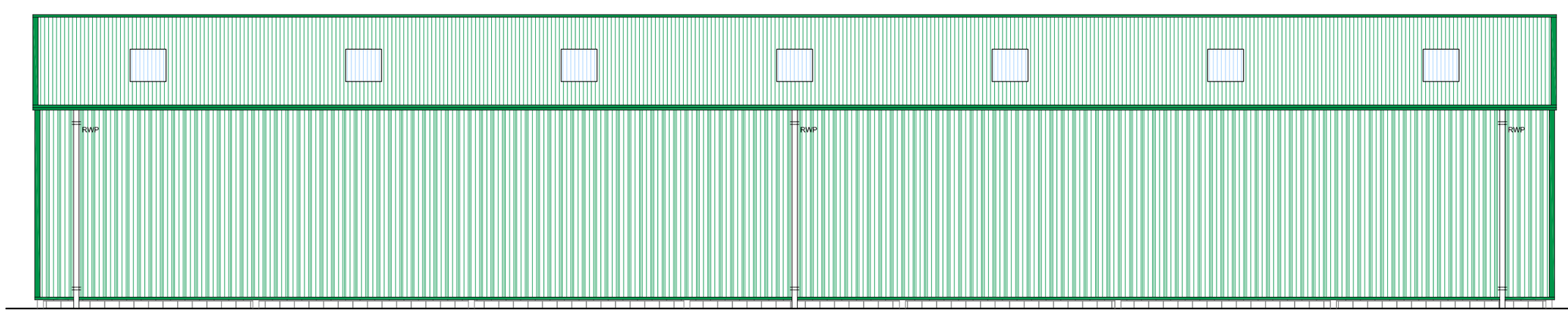

EAST ELEVATION
SCALE - 1:125

SCALE BAR - METRES
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SCALE BAR - METRES
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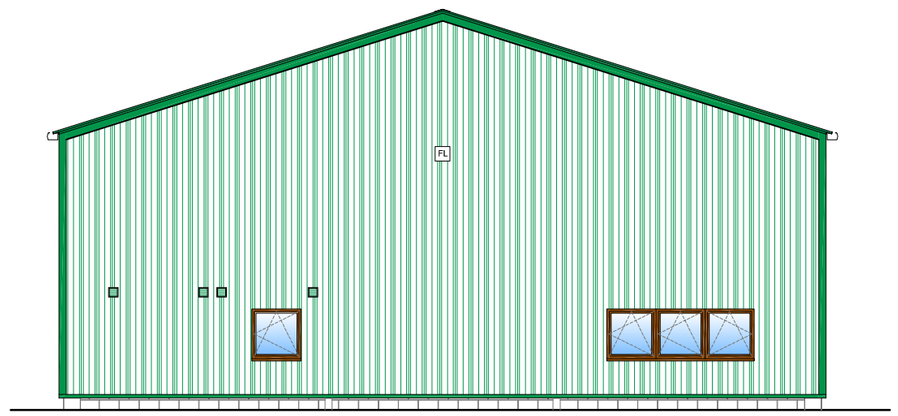

NORTH ELEVATION
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SCALE BAR - METRES
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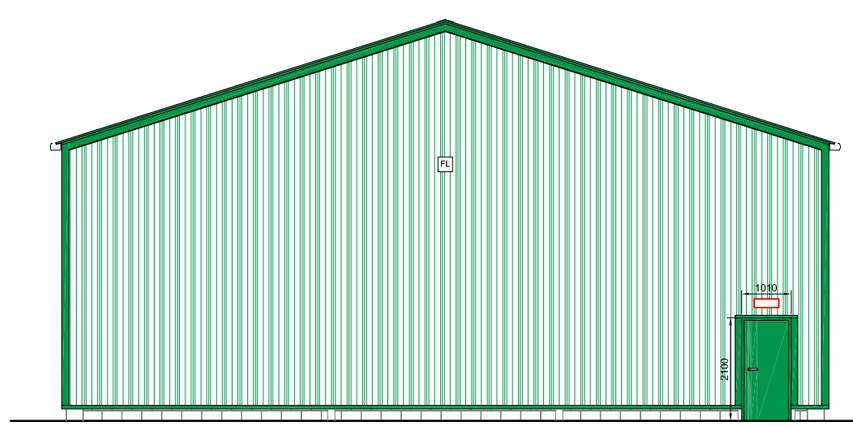

SOUTH ELEVATION
SCALE - 1:100

SCALE BAR - METRES
0 1 2 3 4 5

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Rev.	Date	Descrption	App'd
A	17.02.2020	EXTERNAL LIGHTING ADDED	

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Drawing Sheet Size	Scale	Date
A2	AS SHOWN	04.02.2020

Project Title
PROPOSED AGRICULTURAL DEVELOPMENT AT BALAVIL ESTATE, KINGUSSIE, INVERNESS-SHIRE

Drawing Title
EQUIPMENT / TRACTOR STORE BUILDING FLOOR PLAN & ELEVATIONS

Project Number
E18-062

Drawing Number	Revision
PL_04	**A**

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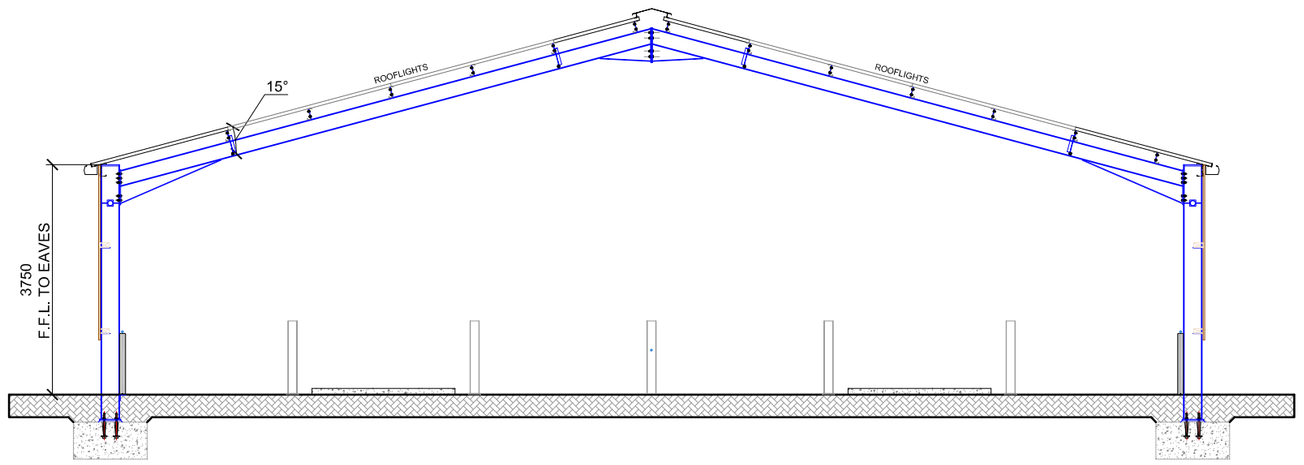

SHEEP BUILDING - SECTION A-A
SCALE - 1:100

SCALE BAR - METRES
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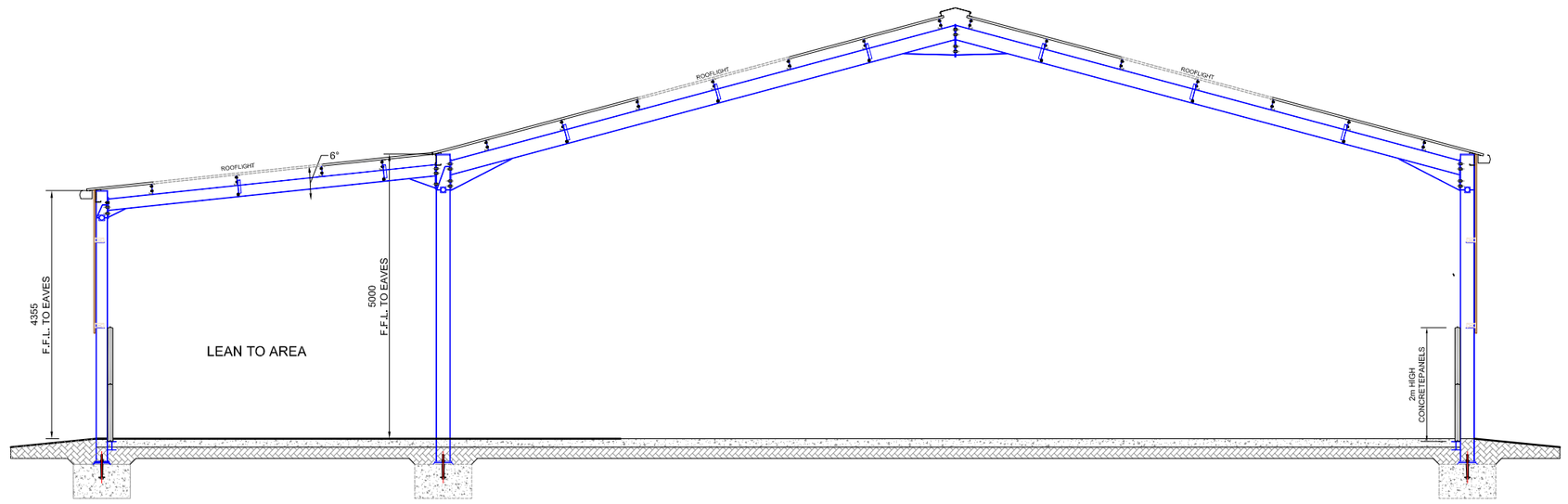

CATTLE BUILDING - SECTION A-A
SCALE - 1:100

SCALE BAR - METRES
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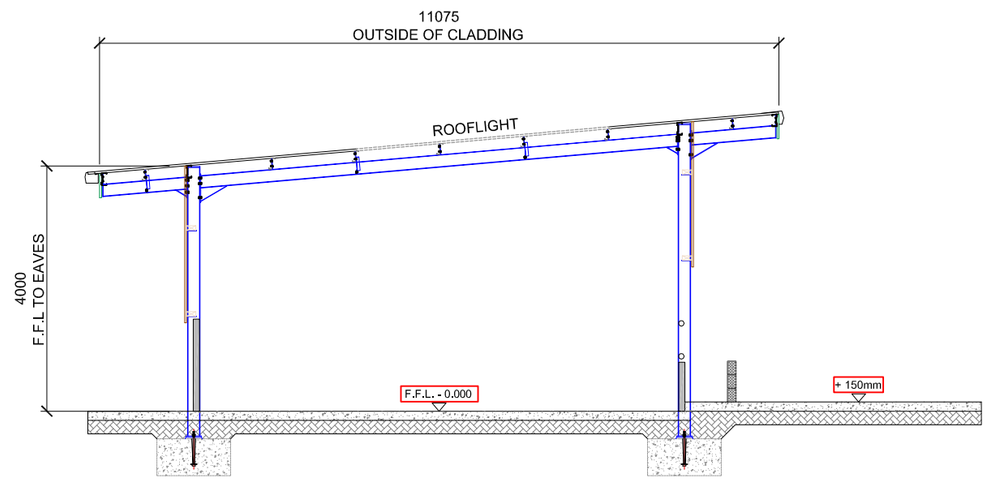

BULL BUILDING - SECTION A-A
SCALE - 1:100

SCALE BAR - METRES
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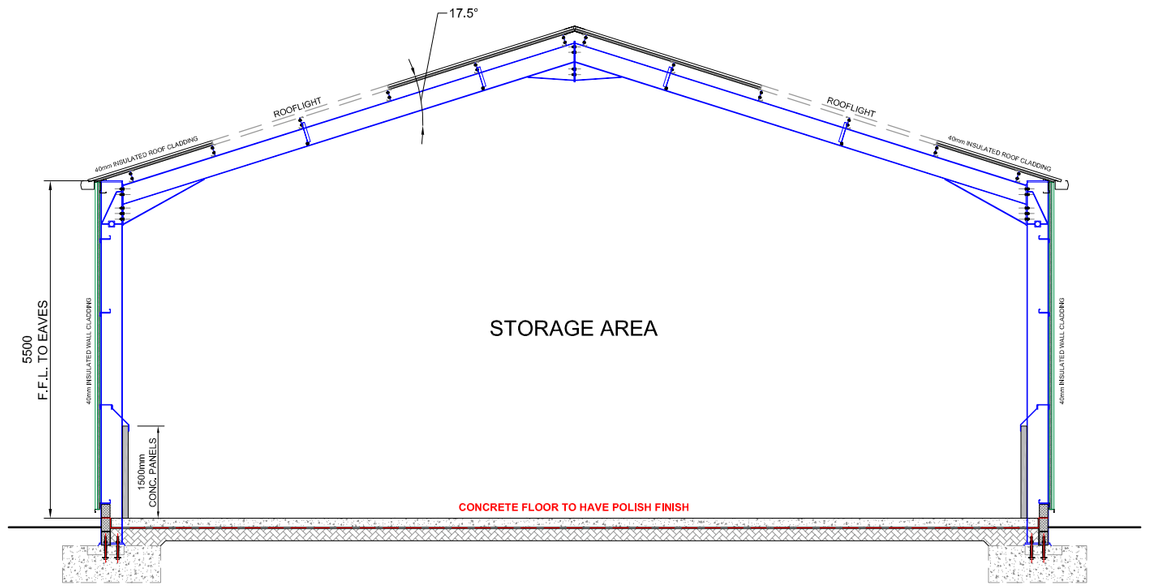

EQUIPMENT & TRACTOR STORE - SECTION A-A
SCALE - 1:100

SCALE BAR - METRES
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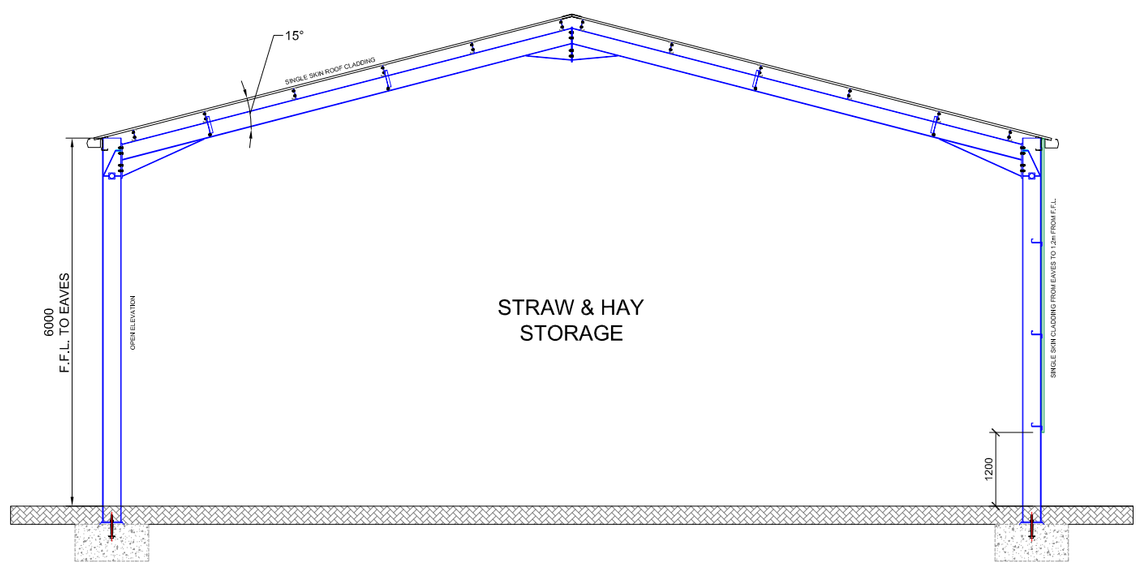

STRAW & HAY STORAGE - SECTION A-A
SCALE - 1:100

SCALE BAR - METRES
0 1 2 3 4 5

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BL	SF	
Drawing Sheet Size	Scale	Date
A2	AS SHOWN	04.02.2020

Project Title
PROPOSED AGRICULTURAL DEVELOPMENT AT BALAVIL ESTATE, KINGUSSIE, INVERNESS-SHIRE

Drawing Title
SECTIONS

Project Number
E18-062

Drawing Number	Revision
PL_06	**-**

KEY

- Site Boundary
- Proposed Stockproof Post & Wire Fencing
- Proposed Gate
- Proposed Lighting Location

Notes:

1. Proposed lighting to be fitted with passive infrared sensor (PIR) to minimise energy use when not required.
2. Proposed floodlight to be fitted with brackets to allow lights to point downwards to illuminate the ground plane avoiding over exposure of light on the surrounding environment.
3. Proposed lighting ensure the safe use of building, works with livestock and farm machinery.
4. Lighting shall not be placed on the south elevations of the sheep shed and cattle building to avoid light spill towards the A9.
5. For external appearance of buildings (elevations and cross sections) refer to Algo drawings E18-062/PL_01 to PL_04.

Revision	Date	Description	Initials
P01	19.02.20	For client issue	LG

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0131 550 6500 | mail@ironsidefarrar.com
EDINBURGH | BELLSHILL | MANCHESTER

Project Name
Farm Relocation
Balavil
Client
Balavil Estate

Title
Proposed Lighting Plan
PPP Condition 2-O

N. Point
Scale 1:250
Scale
Bar Scale 0 5 10m
1:250

Date 23.01.20
Paper Size A1
Drawn By LG
Checked by HR

Quality Assurance
ISO 9001:2015
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Status
FOR APPROVAL

Project No 50499-604
Drawing No
Revision P01

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