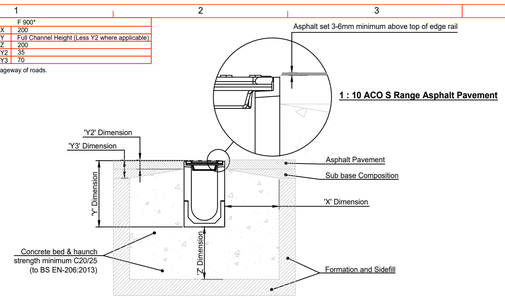
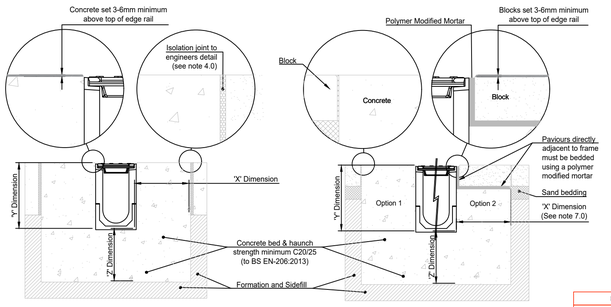
Load Class		F 900*
Minimum	X	200
Dimensions (mm)	Y	Full Channel Height (Less Y2 where applicable)
	Z	200
Maximum	Y2	35
Dimensions (mm)	Y3	70

*Not suitable for carriageway of roads.



1 : 10 ACO S Range Asphalt Pavement



1 : 10 ACO S Range Concrete Pavement

1 : 10 ACO S Range Pavement (option 1 and 2)

NBS Specification:
ACO S Range® should be specified in section Q10.180. Assistance in completing this clause can be found in ACO Technologies product entries in NBS Plus, or a model specification can be downloaded from www.aco.co.uk. For further assistance, contact the ACO Water Management Design Services Team.

Best Practice and Workmanship:
ACO can give guidance with respect to the most suitable methods of installation for each of the products in the ACO S Range® range. ACO S Range® should be installed using levels of workmanship that accord with the National Code of Practice (UK: BS8000-0:2014) and in keeping with BS EN 1433:2002 (Drainage channels for vehicular and pedestrian areas).

Detailed installation statements and methodologies will vary for all sites as each will have different aspects deserving particular consideration, consequently the relevant approvals should be sought from the consulting engineer and/or the installer.

1.0 Load Class
Installation recommendations shown are ACO minimum recommendations for BS EN 1433:2002 load class requirements.

2.0 Ground Conditions
The long term performance of a channel installation to sustain vertical and lateral loads depends upon A) ground conditions B) stability of the adjacent pavement and C) a durable concrete bed and surround. The recommended installation detail may require the minimum dimensions to be revised to achieve site specific load class requirements (referred to in 1.0 above).

3.0 Cutting and Jointing
Mitre joints are formed by cutting the channels to the required angle and butting them together with appropriate sealant (e.g. Sikaflex 11FC or similar) or ACO Repair Kit. Where possible 90° joints and T's should be formed so that gratings do not have to be cut. Angles can be formed by connecting them using proprietary PVCu pipework attached to ACO inlet/outlet endcaps. For further details please contact ACO Design Services Team.
Note: For Load Classes higher than C 250, mitred joints are not recommended in vehicular areas. Where requested ACO can custom manufacture angled junctions to order.

4.0 Isolation Joints
The channel must be isolated from the surrounding environment. An isolation joint must be positioned up to 1500mm from the channel wall. Any dowel bars must be located no nearer than 150mm from the channel wall. Other isolation joints in surrounding slab must be continued through the channel. Additional crack control may be required to comply with specifier requirements.

5.0 Installation into in-situ Slab
Where a channel is to be installed into an existing concrete slab it is necessary to cut a suitably sized pocket in the slab. The channel will then need to be bedded in polymer modified mortar of 25mm minimum thickness (this may vary depending on the type of mortar used). Engineering advice may be necessary.

6.0 Temporary Installation
A channel installation is not complete until the final surfacing is laid. In any temporary condition, i.e. with the channel walls projecting above adjacent ground, site traffic should not cross channels. Loose boards, stone fill or cover plates will not protect the channel walls or grating. A temporary channel crossing should be formed by raising the ground level locally, to 3 - 6mm above top of edge rail, either side of a channel for a distance of 750 to 1000mm, to form ramps. Note that the channel load class should be adequate to carry the site traffic.

7.0 Block Pavements
The channel must be supported laterally. Blocks laid directly against a channel must be laid as a soldier course and restrained from movement by bedding securely on the concrete haunch e.g. by using a polymer modified mortar for bed and perpendicular joints (e.g. RONAFIX mortar mix C or similar). Blocks or slabs bedded on sand remote from the channel should be set at a higher level to compensate for possible settlement of the paving in service.

8.0 Grate Locking System
Gratings should be securely fixed to the channel, where required, using an appropriate grate lock system (where available).
Where the grate locking system incorporates fixing bolts, these should be tightened to the torque of 40Nm.

9.0 Channel Protection
Avoid contact between compaction equipment and top of ACO channel edge rail. The installer must ensure that the finished surface level lies above the top of the edge rail (by at least 3-6mm). Covering or protecting the grating, before concreting the haunch or laying blocks, removes the time and cost associated with cleaning the channel and grating of cement material and embedded stones. (Please note that ACO channels must be installed with the grating in place to prevent deformation of the channel).

10.0 Watertight Installation to BS EN 1433:2002
Where ACO channel joints/fittings and channel/pavement interfaces are to be sealed, an appropriate sealant should be used (e.g. Sikaflex 11FC or similar). Guidance on the necessary surface preparation and/or priming should be sought from the sealant manufacturer.

For Guidance a typical method of application follows:
- The end faces of the channels are to be sound and free from dust, oil, and grease, with any loose material or dirt removed, e.g. by mechanical wire brush. No water drops should be evident.
- Using a standard cartridge gun, apply the sealant evenly and with no flaws. The detail on the ends of a channel varies from one product to another:
- Products with a basically flat face - apply the sealant in a layer approximately 5mm thick to one face of the joint.
- Products with a sealing groove within the end face - apply the sealant in a bead of approximately 10mm diameter into the sealing groove.
- Products with a sealing groove following the inside shape of the channel - apply the sealant to the end face of the channel and to the sealant groove, such that when the joint is completed, the sealant will both cover the end face and fill the groove.
- The channel unit should be placed on the prepared concrete bedding and pressed against the previously placed channel unit. A sealed joint of approximately 1-2mm width should be formed between adjacent channel units.
- Excess sealant should be wiped from the inside face of the channel to leave a smooth finish.
- The sealant is to be left to cure for 24 hours, during which time the sealant should be kept as dry as possible.

Note: Galvanised steel and iron products have good corrosion resistance to concrete and mortar products but may experience corrosion if high chloride and/or sulphate content is present. Use only good quality concrete and consider using corrosion inhibitors where necessary. The use of protective coatings, such as paint, can minimise the risk of corrosion.

B	27.6.2016	Updated title block	TS
Version	Date	Description	Name

ACO Technologies plc
ACO Business Park
Hilcrtin Road
Sheffford
Bedfordshire
SG17 5TE, UK
Tel: 01462 816666
www.aco.co.uk

Drawing Number: 22554 — Revision: B

Title: ACO S-RANGE S100 S020 CHANNEL INSTALLATION DETAIL DRAWING

Created by: TS	Released by: TS	Units: mm	Format: A3
Created at: 6.6.2016	Released at: 27.6.2016	Projection: ISO-A	Scale: 1:10
Replacement for: E1-E01-001-3-c	Replaced by:		Sheet: 1 of 1

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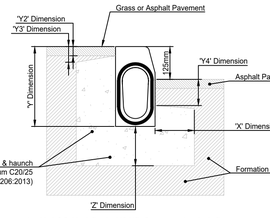
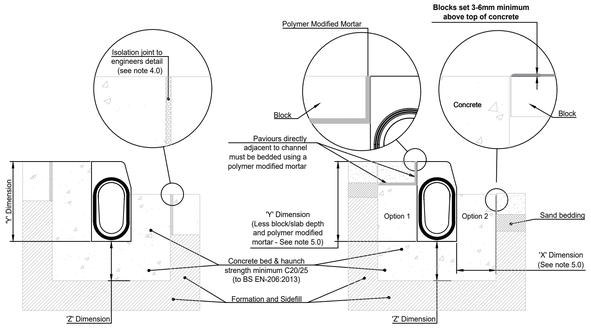
Load Class		A 15	B 125	C 250	D 400**
Minimum	X	150	150	150	150
Dimensions (mm)	Y	Full Channel Height (Less Y2 where applicable)			
	Z	150	150	150	150
Maximum	**Y2	35	35	35	35
Dimensions (mm)	**Y3	60	60	60	60
	Y4	No front haunch			Max 100

** Where regular HGV impacts are anticipated (e.g. roundabouts), We reccomend that the concrete backing is laid to the top of the ACO KerbDrain unit (i.e. Y2 = 0, Y3 = 0).



1 : 10 ACO KerbDrain KDHB Grass or Asphalt Pavement



1 : 10 ACO KerbDrain KDHB Concrete Pavement

1 : 10 ACO KerbDrain KDHB Block Pavement (Option 1 and 2)

Highways Specification - Appendix 5/5:
The Appendix 5/5 will need to be completed for each project. A model Appendix 5/5 for ACO KerbDrain® is available from the ACO Water Management Design Services Team.

NBS Specification:
ACO KerbDrain® should be specified in section Q10.190. Assistance in completing this clause can be found in ACO Technologies product entries in NBS Plus or a model specification can be downloaded from www.aco.co.uk. For further assistance, contact the ACO Water Management Design services Team.

Best Practice and Workmanship:
ACO can give guidance with respect to the most suitable methods of installation for each of the products in the ACO KerbDrain® range. ACO KerbDrain® should be installed using acceptable levels of workmanship according to the National Code of Practice (UK: BS8000-0:2014) in keeping with EN 1433:2002 (Drainage channels for vehicular and pedestrian areas).

Detailed installation statements and methodologies will vary for all sites as each will have different aspects deserving particular consideration, consequently the relevant approvals should be sought from the consulting engineer and/or the installer.

1.0 Load Class
Installation recommendations shown are ACO minimum recommendations for BS EN 1433:2002 load class requirements.

2.0 Ground Conditions
The long term performance of a channel installation to sustain vertical and lateral loads depends upon A) ground conditions B) stability of the adjacent pavement and C) a durable concrete bed and surround. The recommended installation detail may require the minimum dimensions to be revised to achieve site specific load class requirements (referred to in 1.0 above).

3.0 Cutting and Jointing
Mitre joints are formed by cutting the channels to the required angle and butting them together with appropriate sealant (e.g. Sikaflex 11FC or similar) or ACO Repair Kit. Angles can be formed using radius or mitre units or by connecting them using proprietary PVCu pipework attached to ACO inlet/outlet endcaps. For further details please contact ACO Design Services Team.
Note: Where requested ACO can custom manufacture angled units to order.

4.0 Isolation Joints
The channel must be isolated from the surrounding environment. An isolation joint must be positioned up to 1500mm from the channel wall. Any dowel bars must be located no nearer than 150mm from the channel wall. Other isolation joints in surrounding slab must be continued through the channel. Additional crack control may be required to comply with specifier requirements.

5.0 Block Pavements
The channel must be supported laterally. Blocks laid directly against a channel must be laid as a soldier course and restrained from movement by bedding securely on the concrete haunch e.g. by using a polymer modified mortar for bed and perpendicular joints (e.g. RONAFIX mortar mix C or similar). Alternatively, extend concrete haunch up to finished paving level (as depicted in Option 2). Blocks or slabs bedded on sand remote from the channel should be set at a higher level to compensate for possible settlement of the paving in service.

6.0 Watertight Installation to BS EN 1433:2002
Where ACO channel joints/fittings and channel/pavement interfaces are to be sealed, an appropriate sealant should be used (e.g. Sikaflex 11FC or similar). Guidance on the necessary surface preparation and/or priming should be sought from the sealant manufacturer.

For Guidance a typical method of application follows:
- The end faces of the channels are to be sound and free from dust, oil, and grease, with any loose material or dirt removed, e.g. by mechanical wire brush. No water drops should be evident.
- Using a standard cartridge gun, apply the sealant evenly and with no flaws. The detail on the ends of a channel varies from one product to another:
- Products with a basically flat face - apply the sealant in a layer approximately 5mm thick to one face of the joint.
- Products with a sealing groove within the end face - apply the sealant in a bead of approximately 10mm diameter into the sealing groove.
- Products with a sealing groove following the inside shape of the channel - apply the sealant to the end face of the channel and to the sealant groove, such that when the joint is completed, the sealant will both cover the end face and fill the groove.
- The channel unit should be placed on the prepared concrete bedding and pressed against the previously placed channel unit. A sealed joint of approximately 1-2mm width should be formed between adjacent channel units.
- Excess sealant should be wiped from the inside face of the channel to leave a smooth finish.
- The sealant is to be left to cure for 24 hours, during which time the sealant should be kept as dry as possible.

Note: Galvanised steel and iron products have good corrosion resistance to concrete and mortar products but may experience corrosion if high chloride and/or sulphate content is present. Use only good quality concrete and consider using corrosion inhibitors where necessary. The use of protective coatings, such as paint, can minimise the risk of corrosion.

C	28.6.2016	Updated title block	TS
B	1.6.2016	Revised to comments 12/04/16	TS
Version	Date	Description	Name

ACO Technologies plc
ACO Business Park
Hilcrtin Road
Sheffford
Bedfordshire
SG17 5TE, UK
Tel: 01462 816666
www.aco.co.uk

Drawing Number: 21940 — Revision: C

Title: ACO KERBDRAIN KDHB305 CHANNEL INSTALLATION DETAIL DRAWING

Created by: IM	Released by: TS	Units: mm	Format: A3
Created at: 11.1.2016	Released at: 28.6.2016	Projection: ISO-A	Scale: 1:10
Replacement for: E1-E01-008-3-f	Replaced by:		Sheet: 1 of 1

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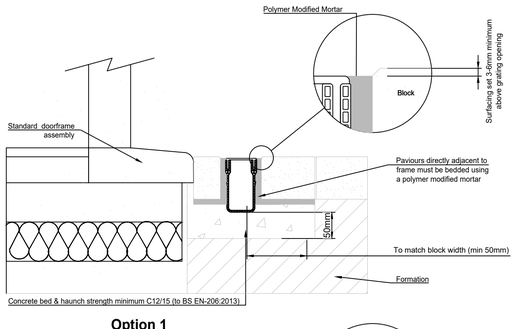
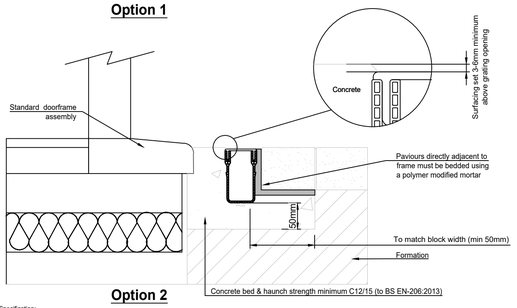


Option 1



Option 2

NBS Specification:
ACO S Range® should be specified in section Q10.180. Assistance in completing product entries in NBS Plus, or a model specification can be downloaded from www.aco.co.uk. For further assistance, contact the ACO Water Management Design Services Team.

Best Practice and Workmanship:
ACO can give guidance with respect to the most suitable methods of installation for each of the products in the ACO S Range® range. ACO S Range® should be installed using levels of workmanship that accord with the National Code of Practice (UK: BS8000-0:2014) and in keeping with BS EN 1433:2002 (Drainage channels for vehicular and pedestrian areas).

Detailed installation statements and methodologies will vary for all sites as each will have different aspects deserving particular consideration, consequently the relevant approvals should be sought from the consulting engineer and/or the installer.

1.0 Load Class
Installation recommendations shown are ACO minimum recommendations for BS EN 1433:2002 load class requirements.

2.0 Ground Conditions
The long term performance of a channel installation to sustain vertical and lateral loads depends upon A) ground conditions B) stability of the adjacent pavement and C) a durable concrete bed and surround. The recommended installation detail may require the minimum dimensions to be revised to achieve site specific load class requirements (referred to in 1.0 above).

3.0 Cutting and Jointing
Mitre joints are formed by cutting the channels to the required angle and butting them together with appropriate sealant (e.g. Sikaflex 11FC or similar) or ACO Repair Kit. Where possible 90° joints and T's should be formed so that gratings do not have to be cut. Angles can be formed by connecting them using proprietary PVCu pipework attached to ACO inlet/outlet endcaps. For further details please contact ACO Design Services Team.
Note: For Load Classes higher than C 250, mitred joints are not recommended in vehicular areas. Where requested ACO can custom manufacture angled junctions to order.

4.0 Isolation Joints
The channel must be isolated from the surrounding environment. An isolation joint must be positioned up to 1500mm from the channel wall. Any dowel bars must be located no nearer than 150mm from the channel wall. Other isolation joints in surrounding slab must be continued through the channel. Additional crack control may be required to comply with specifier requirements.

5.0 Installation into in-situ Slab
Where a channel is to be installed into an existing concrete slab it is necessary to cut a suitably sized pocket in the slab. The channel will then need to be bedded in polymer modified mortar of 25mm minimum thickness (this may vary depending on the type of mortar used). Engineering advice may be necessary.

6.0 Temporary Installation
A channel installation is not complete until the final surfacing is laid. In any temporary condition, i.e. with the channel walls projecting above adjacent ground, site traffic should not cross channels. Loose boards, stone fill or cover plates will not protect the channel walls or grating. A temporary channel crossing should be formed by raising the ground level locally, to 3 - 6mm above top of edge rail, either side of a channel for a distance of 750 to 1000mm, to form ramps. Note that the channel load class should be adequate to carry the site traffic.

7.0 Block Pavements
The channel must be supported laterally. Blocks laid directly against a channel must be laid as a soldier course and restrained from movement by bedding securely on the concrete haunch e.g. by using a polymer modified mortar for bed and perpendicular joints (e.g. RONAFIX mortar mix C or similar). Blocks or slabs bedded on sand remote from the channel should be set at a higher level to compensate for possible settlement of the paving in service.

8.0 Grate Locking System
Gratings should be securely fixed to the channel, where required, using an appropriate grate lock system (where available).
Where the grate locking system incorporates fixing bolts, these should be tightened to the torque of 40Nm.

9.0 Channel Protection
Avoid contact between compaction equipment and top of ACO channel edge rail. The installer must ensure that the finished surface level lies above the top of the edge rail (by at least 3-6mm). Covering or protecting the grating, before concreting the haunch or laying blocks, removes the time and cost associated with cleaning the channel and grating of cement material and embedded stones. (Please note that ACO channels must be installed with the grating in place to prevent deformation of the channel).

10.0 Watertight Installation to BS EN 1433:2002
Where ACO channel joints/fittings and channel/pavement interfaces are to be sealed, an appropriate sealant should be used (e.g. Sikaflex 11FC or similar). Guidance on the necessary surface preparation and/or priming should be sought from the sealant manufacturer.

For Guidance a typical method of application follows:
- The end faces of the channels are to be sound and free from dust, oil, and grease, with any loose material or dirt removed, e.g. by mechanical wire brush. No water drops should be evident.
- Using a standard cartridge gun, apply the sealant evenly and with no flaws. The detail on the ends of a channel varies from one product to another:
- Products with a basically flat face - apply the sealant in a layer approximately 5mm thick to one face of the joint.
- Products with a sealing groove within the end face - apply the sealant in a bead of approximately 10mm diameter into the sealing groove.
- Products with a sealing groove following the inside shape of the channel - apply the sealant to the end face of the channel and to the sealant groove, such that when the joint is completed, the sealant will both cover the end face and fill the groove.
- The channel unit should be placed on the prepared concrete bedding and pressed against the previously placed channel unit. A sealed joint of approximately 1-2mm width should be formed between adjacent channel units.
- Excess sealant should be wiped from the inside face of the channel to leave a smooth finish.
- The sealant is to be left to cure for 24 hours, during which time the sealant should be kept as dry as possible.

Note: Galvanised steel and iron products have good corrosion resistance to concrete and mortar products but may experience corrosion if high chloride and/or sulphate content is present. Use only good quality concrete and consider using corrosion inhibitors where necessary. The use of protective coatings, such as paint, can minimise the risk of corrosion.

B	29/01/2018	Misc Changes	WBP
A	19/01/2018	Title Block	WBP
Version	Date	Description	Name

ACO Technologies plc
ACO Business Park
Hilcrtin Road
Sheffford
Bedfordshire
SG17 5TE, UK
Tel: 01462 816666
www.aco.co.uk

Drawing Number: 24125 — Revision: B

Title: ACO THRESHOLD DRAIN INSTALLATION DETAIL DRAWING

Created by: WBP	Released by: WBP	Units: mm	Format: A3
Created at: 09/11/2017	Released at: 19/01/2018	Projection: ISO-A	Scale: 1:5
Replacement for:	Replaced by:		Sheet: 1 of 1

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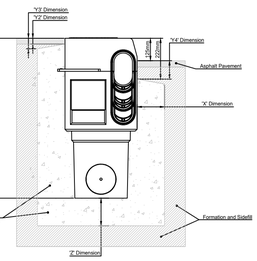
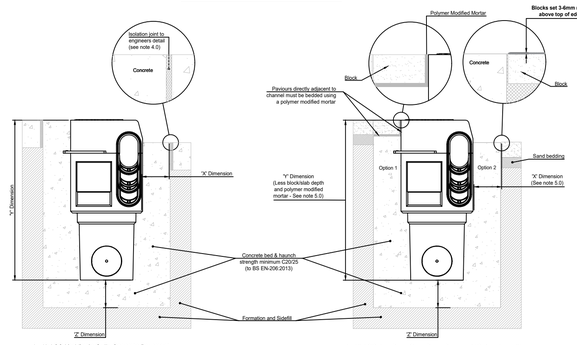
Load Class		A 15	B 125	C 250	D 400**
Minimum	X	150	150	150	150
Dimensions (mm)	Y	Full Channel Height (Less Y2 where applicable)			
	Z	150	150	150	150
Maximum	**Y2	35	35	35	35
Dimensions (mm)	**Y3	60	60	60	60
	Y4	No front haunch			Max 100

** Where regular HGV impacts are anticipated (e.g. roundabouts), We reccomend that the concrete backing is laid to the top of the ACO KerbDrain unit (i.e. Y2 = 0, Y3 = 0).



1 : 10 ACO KerbDrain Gully Grass or Asphalt Pavement



1 : 10 ACO KerbDrain Gully Concrete Pavement

1 : 10 ACO KerbDrain Gully Block Pavement (Option 1 and 2)

Highways Specification - Appendix 5/5:
The Appendix 5/5 will need to be completed for each project. A model Appendix 5/5 for ACO KerbDrain® is available from the ACO Water Management Design Services Team.

NBS Specification:
ACO KerbDrain® should be specified in section Q10.190. Assistance in completing this clause can be found in ACO Technologies product entries in NBS Plus or a model specification can be downloaded from www.aco.co.uk. For further assistance, contact the ACO Water Management Design services Team.

Best Practice and Workmanship:
ACO can give guidance with respect to the most suitable methods of installation for each of the products in the ACO KerbDrain® range. ACO KerbDrain® should be installed using acceptable levels of workmanship according to the National Code of Practice (UK: BS8000-0:2014) in keeping with EN 1433:2002 (Drainage channels for vehicular and pedestrian areas).

Detailed installation statements and methodologies will vary for all sites as each will have different aspects deserving particular consideration, consequently the relevant approvals should be sought from the consulting engineer and/or the installer.

Version	Date	Description	Name

ACO Technologies plc
ACO Business Park
Hilcrtin Road
Sheffford
Bedfordshire
SG17 5TE, UK
Tel: 01462 816666
www.aco.co.uk

Drawing Number: 21969 — Revision: A

Title: ACO KERBDRAIN KDHB610 GULLY INSTALLATION DETAIL DRAWING

Created by: IM	Released by: TS	Units: mm	Format: A3
Created at: 12.1.2016	Released at: 19.9.2016	Projection: ISO-A	Scale: 1:10
Replacement for: E1-E01-008-3-f	Replaced by:		Sheet: 1 of 1

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NOTES

1. DO NOT SCALE.
2. THIS DRAWING IS TO BE READ IN CONJUNCTION WITH ALL OTHER RELEVANT DRAWINGS.
3. SHOULD THERE BE ANY DISCREPANCY BETWEEN DETAILS INDICATED ON THIS DRAWING AND THOSE INDICATED ON OTHER DRAWINGS THE ENGINEER SHOULD BE INFORMED PRIOR TO CONSTRUCTION ON SITE.
4. ALL DIMENSIONS SHOWN ARE IN METRES UNLESS NOTED OTHERWISE.

REV.	DATE	DETAILS	DRN.	CHK.
P01	16.06.25	DRAFT STAGE 4 ISSUE	ARJ	PAW

DRAWING STATUS
PRELIMINARY

RIBA STAGE
STAGE 4

RoC CONSULTING
Fourways House
RoC Consulting
3rd Floor, 57 Hilton Street
Manchester M1 2EJ
T 0161 214 5390
W rocconsulting.com

DRAWN	DATE	SCALES
ARJ	SEPT 24	AS SHOWN
CHECKED	DATE	THE ABOVE SCALES APPLY WHEN PLOTTED AT A1 SIZE --DO NOT SCALE--
MN	SEPT 24	
APPRVD.	DATE	EMAIL FOR DRAWINGS
MN	SEPT 24	info@rocconsulting.com

CLIENT
MANCHESTER AIRPORT GROUP

PROJECT TITLE
PLOT H5 PREMIER INN
AIRPORT CITY

DRAWING TITLE
DRAINAGE DETAILS
SHEET 4

DRAWING No.
H5PI/ROC/PI/XX/DR/C/0504

REV.
P01

4700

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