ARMSTRONG STOKES & CLAYTON LIMITED
Civil & Structural Engineering Consultants

E.P. Barrus Ltd

Planning Application for a Proposed Warehouse & Service Yard Extension

Glen Way, Launton Road
Bicester, Oxfordshire

Foul & Surface Water Drainage Statement

August 2023

AUTHOR:	JS
CHECKED:	JLW
APPROVED:	JS
REPORT REF:	FRA115 E.P. Barrus Ltd, Launton Road, Bicester – DS RevA
STATUS:	FINAL

Regus House, Herald Way, Pegasus Business Park,
Castle Donington, Derbyshire, DE74 2TZ
Tel: 01159 417 893

Registered in England No. 04960061

Introduction

1. This Drainage Statement has been prepared with respect to the proposal for a new warehouse, an extension of a service yard and new reception area at the E.P. Barrus Ltd site at Glen Way, Launton Road, Bicester. The statement investigates the following:

(i) A review of the existing drainage associated with the site.
(ii) The location of potential outfalls for the new development.
(iii) If a suitable foul drainage solution is available.
(iv) If a Sustainable Drainage System (SuDS) solution for surface water is available.

2. This report replaces the previous statement and has been updated following receipt of comments from the Lead Local Flood Authority in response to the planning application. A copy of the LLFA comments is attached within **Appendix A**, with key issues summarised as follows:

- *Drainage strategy drawing to be provided.*
- *Provide surface water catchment plan.*
- *Updated calculations to be provided to include the infiltration rates obtained.*
- *Provide maintenance regime.*

Existing Site

3. The wider E.P Barrus site consists of large industrial buildings supported by extensive hard standing areas such as car park and service yards associated with the engineering operations of the company. The site is bounded to the west by Launton Road, which provides access to the site via Glen Way. To the south is Granville Way, with further industrial developments to the northern and eastern boundaries of the site.

4. The areas within the site proposed for development currently consist of an existing green space area made up of lawn and soft landscaping, along with part of an existing delivery yard. In addition, a section of the southern car park is proposed for re-development, which will include reconfiguring a small area of the current parking

layout. Within **Appendix B** is a site location and plan illustrating the existing layout of the site.

5. The topography of the site is relatively level in the region of circa 69.60m AOD, with some localised lower and higher topography. A copy of the topographical survey is included within **Appendix C**.

6. The current buildings and hard standing areas are all positively drained via private drainage networks. To support the application a CCTV survey of the below ground drainage systems has been undertaken, with the results included within **Appendix D.** The survey results confirm that the below ground drainage consists of separate foul and surface water piped networks, which are in a good condition. Both the foul and surface water private drainage systems have an outfall to the adjoining public sewer networks within Granville Way, whilst the northern car park drains surface water run-off to soakaways. A copy of the drainage design drawing for the northern car park is also included within **Appendix D**.

Proposed Development

7. The proposal includes the development of a new 570m2 warehouse located to the northern portion of the site on an existing green space area of lawn and soft landscaping, along with utilising some of an existing delivery yard area. The second element of the application to be assessed by this Drainage Statement is to increase the area of an existing service yard located within the southern portion of the site. This will be extended across an existing car park, which will be reconfigured to suit the new service yard layout. In addition, new development areas which replace or are within existing hard standing areas include a new reception area, the reconfiguring of pedestrian routes, car park areas and the addition of EV charging terminals.

8. Whilst the finish floor level of the new warehouse is to be finalised at the detailed design stage, it will generally reflect the existing topography plus a minimum of 150mm above the adjoining ground level. In addition, from an operational approach it will also reflect the finished floor levels of the adjacent industrial buildings within the E. P. Barrus site. Within **Appendix E** is a copy of the development proposal layout.

Foul Drainage

9. Based on a proposal for a 570m2 warehouse the peak foul discharge generated @ 150 l/100m2/day at 6dwf + 20% will be less than 0.1 l/s. It is understood that the new extended service yard and reception area will not generate a foul flow.

10. It is proposed to discharge the foul flows generated by the new industrial unit to the existing private foul drainage network within the site. A gravity discharge will be available to the adjoining network.

11. At the detailed design stage, a foul drainage design will be promoted, with an application in accordance with a section 106 of the Water Industry Act 1991 submitted to the local water authority for any additional flow to the downstream public sewer network. Due to the low level of flow generated by the new development; it is anticipated that the local water authority will approve the section 106.

12. All new drainage works will be in accordance with Part H of the current Building Regulations. The new drainage works will be maintained in perpetuity by E.P. Barrus Ltd as part of the wider existing site maintenance strategy programme.

Surface Water Drainage Strategy

13. A sustainable surface water drainage strategy that does not increase discharge rates and therefore does not increase the risk of flooding to other areas should be provided in accordance with the NPPF. Furthermore, the surface water drainage strategy should actively seek to reduce positive discharge levels via the use of SuDS wherever possible.

14. To establish the surface water strategy for the development the following assessment of outfall options, in order of priority, should be considered in accordance with the CIRIA C753 SuDS Manual:

- *Into the Ground (Infiltration)*
- *to a Surface Water Body*
- *to a Surface Water Sewer, Highway Drain, or another Drainage System*
- *to a Combined Sewer.*

15. *Into the Ground (Infiltration)* – A detailed investigation of the infiltration characteristics of the existing formation at the location of the new warehouse has been undertaken. Within **Appendix F** is a copy of the BRE365 infiltration test results, which provide a range of infiltration between 2.02 x 10-4 m/s and 2.37 x 10-4 m/s. The results clearly illustrate that the formation is suitable for the use of infiltration SuDS.

16. With no landscape areas available for an infiltration basin a cellular soakaway, located a minimum of 5.0m from a building structure, is to be promoted. The soakaway will be sized in accordance with the lowest infiltration rate provided using the Micro Drainage software suite with the following design criteria: -

- Development Contributing Imp. Area – 0.057 ha
- Design Events – 1 in 10, 30, 100 & 100 year plus a 40% allowance for climate change
- Soakaway Structure Effective Depth – 1.0m (Total depth 2.35m)

17. Within **Appendix G** is a copy of the hydraulic calculations for the 1 in 10 year, 30 year, 100 year and 100 year plus a 40% allowance for climate change. The calculations illustrate that a cellular soakaway with an area of 19.5m2 and a 1.0m effective depth will be required to accommodate the rainfall events assessed.

18. *To a Surface Water Body* – There is no surface water body within or adjacent to the site.

19. *To a Surface Water Sewer, Highway Drain, or another Drainage System* – As porosity is available, the new warehouse will drain surface water run-off via infiltration SuDS in the form of a soakaway in lieu of a connection to a surface water drain.

20. With regards to the service yard extension, which replaces an area of existing car park, a '*like for like'* discharge is to be promoted to the existing piped drainage system. There is no increase in flows in the post development scenario from the pre-developed site, thus no additional attenuation for this area is proposed, with the small bore drainage layout adjusted where necessary to accommodate the falls

of the new service yard. This scenario is also promoted for the new reception area that replaces an existing area of hard paved car park.

21. *To a Combined Sewer* – This has not been explored as in accordance with the SuDS hierarchy an outfall via infiltration SuDS is to be promoted.

22. In terms of other SuDS techniques, the new service yard is to be designed to accommodate high vehicle loadings due to the potential for HGV movement, and thus permeable paving would not be suitable in this location. The use of a green roof for the warehouse unit would not be suitable for the type of structure to be constructed, with rainwater harvesting systems likely to prove cost prohibitive and impractical for an industrial development of this nature.

23. At the detailed design stage a comprehensive surface water drainage design will be promoted, which will be in accordance with all relevant Environment Agency Pollution Prevention Guidance (PPG).

24. A gravity discharge, where required, will be available to the adjoining network.

25. All new drainage works will be in accordance with Part H of the current Building Regulations. Within **Appendix H** is a copy of the proposed preliminary Drainage Layout, which illustrates the proposed soakaway for the new warehouse and the existing surface water drainage that will collect run-off from the extended service yard and new reception, that both replace existing hard paved car park areas.

26. The new drainage works will be maintained in perpetuity by E.P. Barrus Ltd as part of the wider existing site maintenance strategy programme, which will now include the attached Maintenance and Management Plan within **Appendix I** for the new soakaway and associated small bore piped system.

Conclusion

27. The peak foul discharge to the existing private drainage network is negligible at less than 0.1 l/s.

28. In accordance with the C753 SuDS hierarchy, the surface water discharge from the new warehouse is to drain via infiltration SuDS in the form of a below ground cellular soakaway.

29. The extended service yard and new reception do not increase impermeable area as they directly replace existing drained hard paved car park areas, and thus there is no increase in flows in the post development scenario. They will therefore drain to the existing below ground piped drainage system.

30. With consideration of the drainage proposals, there will be no increase in the residual flood risk to the site or other areas as a result of the development proposals.

31. The new soakaway will contain flows generated by the 1 in 100 year storm event plus a 40% allowance for climate change.

32. All drainage works will be constructed in accordance with Part H of the current Building Regulations, with the drainage network maintained in perpetuity by E.P. Barrus Ltd as part of the wider existing site maintenance strategy programme, which will now include the Maintenance and Management Plan for the new soakaway and associated small bore piped system.

33. In response to the LLFA comments, the following summary to each key issue is provided below:

- *Drainage strategy drawing to be provided.*

  A drainage layout is attached within Appendix H, which illustrates the proposed soakaway for the new warehouse, and the existing drainage that will collect run-off from the extended service yard and new reception which are constructed within existing drained hard paved areas.

- *Provide surface water catchment plan.*

  The catchment for the new warehouse, extended service yard and new reception is illustrated on the drainage layout within Appendix H, which includes the red line application boundary.

- *Updated calculations to be provided to include the infiltration rates obtained.*

  Updated infiltration calculations for the 1 in 10, 30, 100 and 100 year + 40% climate change events are attached within Appendix G.

- *Provide maintenance regime.*

  A copy of the Maintenance and Management Plan for the new soakaway and associated small bore piped system is included within Appendix I, which will form part of the wider E.P. Barrus Ltd existing site maintenance strategy programme.

APPENDIX A

LLFA Correspondence

Application no: 23/00390/F
Location: E P Barrus Ltd, E P Barrus Ltd, Launton Road, Bicester, OX26 4UR

Lead Local Flood Authority

Recommendation:

Objection

Key issues:

- Drainage strategy drawing to be provided.
- Provide surface water catchment plan.
- Updated calculations to be provided to include the infiltration rates obtained.
- Provide maintenance regime.

Detailed comments:

Drainage strategy drawings needs to be provided to show the site boundary. The extent of the proposals needs to be highlighted clearly. Its not clear on the drawing what is existing and proposed. The proposals for the service yard should be shown and how this will be picked up by the existing drainage system. Clearly to be demonstrated by existing and proposed drainage features. All the information should be presentable and keyed up for the LLFA to understand.

Provide surface water catchment plan showing the extent of the impermeable areas and stating the area. This is crucial for the LLFA to understand in order to review the calculations.

Updated calculations has not been provided to incorporate the infiltration rates obtained. Calculation to be provided for all storm events up to and including the 1:100 year plus 40% climate change.

Provide maintenance regimes for the SuDS features and drainage infrastructure. Also provide details of the party that will be responsible for the maintenance of the drainage features.

Officer's Name: Kabier Salam
Officer's Title: LLFA Engineer
Date: 21/07/2023

APPENDIX B

Location Plan & Existing Site Layout

LOCATION PLAN

All dimensions to be checked on site.

Do not scale dimensions from this drawing, use figured dimensions.

Refer to Engineer's drawings and specification for all structural and services information.

Any discrepancies between the Architect's and Engineer's drawings to be reported to the Architect immediately.

The survey information shown on this drawing is based on a survey prepared by a third party and NCA Architects accept no responsibility for the accuracy or completeness of the survey

These drawings have been amended to attain Record drawing status based on information received from the Main Contractor.

Note: Detailed design information for Various components / constructions are indicated on separate specialist sub-contractor drawings, & may supersede the information shown on this drawing.

Existing Trees / Planting.

Pedestrian access onto site from Granville Way.

Existing motorcycle parking.

Security bollards are removable to permit emergency access.

Existing Soft Landscaping.

Workshop building within service yard.

Gravel between boundary wall / building and footpath.

Existing Trees / Planting.

Security bollards.

Area of lawn and soft landscaping.

Existing security gate into existing delivery yard.

Temporary storage within delivery yard..

Existing reception area..

Service Yard

Training Centre

Showroom

Administration

Delivery Yard.

Main Warehouse & Assembley Line

N

0 5 10 15 20 25m

Rev	Date	Description

nca-**architecture**

tel: 01869 226610

email: enquiries@nca-architecture.co.uk
www.nca-architecture.co.uk

7 Court Farm Barns
Medcroft Road
Tackley, OXON
OX5 3AL

Barrus, Bicester

Existing Site Plan

220025 - A - PR - 100

Date: **12.09.2022**
Scale: **1:500@A3**
Status: **Preliminary**
Drawn: **JC**
Revision:

APPENDIX C

Topographical Survey

NOTES

GENERAL NOTES :-

ALL LEVELS ARE IN METRES DERIVED FROM GPS TRANSFORMATION.

GRID COORDINATES ARE ORDINANCE SURVEY NATIONAL GRID DERIVED FROM GPS TRANSFORMATION. GPS COORDINATES AND LEVELS SET AT ST02 (NO SCALE FACTOR APPLIED)

THIS DRAWING HAS BEEN PRODUCED WITH A PLOT SCALE ACCURACY OF 1:200

SERVICE COVERS INDICATED WHERE VISIBLE. PIPE INVERTS / DETAILS SURVEYED FROM SURFACE INSPECTION ONLY. GENERALLY DAMAGED COVERS AND COVERS WITHIN HIGHWAYS WILL NOT BE LIFTED

TREE SPECIES SHOULD BE CONFIRMED BY TREE SPECIALIST IF CRITICAL.

OVERHEAD CABLES ARE INDICATED USING REMOTE SURVEY METHODS AND ARE SUBJECT TO SEASONAL VARIATION, AND SHOULD BE TREATED AS APPROXIMATE.

THE SURVEYOR WILL NOT BE RESPONSIBLE FOR THE OMISSION OF DETAILS OBSCURED DURING SITE SURVEY

RICS PROFESSIONAL STANDARDS 3RD EDITION RULE 1.19 APPLIES TO THIS SURVEY.

TOPOGRAPHICAL SURVEY/UTILITY KEY :-

(ht) – height
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● – pea trap
a/g – above ground
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catv – cable television
cl – cover level
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cws – combined water sewer
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ejb – electric junction box
elec – electric
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sap – sapling
sec fence – security fence
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SURVEY CONTROL :-

STATION	EASTINGS	NORTHINGS	LEVEL
ST01	459426.1398	222843.6256	69.230
ST02	459341.0330	222905.0060	69.996
ST03	459392.9756	222946.0347	69.881
ST04	459387.4053	222894.5129	69.255
ST05	459343.5244	222951.1595	70.522
ST06	459422.0751	222976.2296	69.954
ST07	459401.7586	223022.2432	70.508
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ST09	459450.3966	222956.9985	69.372
ST10	459446.6692	222951.2458	69.396
ST11	459486.7296	222974.6023	69.387
ST12	459461.4283	222992.5501	69.422
ST13	459506.7925	222961.1387	69.437
ST14	459468.3974	222906.0130	69.551
ST15	459442.9868	222870.6135	69.511
ST16	459429.7957	222852.0272	69.547
ST17	459387.4894	222881.5398	69.340

SHEET LAYOUT :-

A0-SHEET 40869/1

UTILITY SURVEY KEY :-

HATCHED AREA
BOREHOLE
CPT
TRIAL PIT
HAND PIT
WINDOW SAMPLE

ELECTRIC CABLE
WATER PIPE
FOUL SEWER
STORM SEWER
COMBINED SEWER
DUCTS
CABLE TELEVISION
DATA CABLE
TELECOM CABLE
GAS PIPE
UNIDENTIFIED SERVICE
OTHER
CCTV
TRAFFIC LIGHT
OFFSET FILL
VENT
FUEL PIPE
GAUGE LINES
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UTILITY NOTES

NORTH

0 2 4 8 12 16 20

MIDLAND SURVEY LTD

HEAD OFFICE
Cromwell House, Westfield Road, Southam, Warwickshire, CV47 0JH.
Tel: 01926 810811 Fax 01926 810812
E-Mail: mail@midlandsurvey.co.uk
www.midlandsurvey.co.uk

Client	FRAMPTONS TOWN PLANNING TLD.
Project	E.P. BARRUS, LAUNTON ROAD, BICESTER
Title	TOPOGRAPHICAL SURVEY
Date	APRIL 2022
Scale	1:200@A0
Dwg No	40869/1
Surveyor	L.D.
Checked	J.S.

Revisions

TOPOGRAPHICAL (LAND) SURVEYORS / UTILITY SURVEYORS
BUILDING MEASUREMENT SURVEYORS / 3D LASER SCANNING

Accredited Contractor · constructionLine · THE SURVEY ASSOCIATION

459426E
459505E
459585E
223050N
223000N
222950N
222900N
222850N

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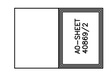

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Revisions

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BUILDING MEASUREMENT SURVEYORS / 3D LASER SCANNING

APPENDIX D

CCTV Drainage Survey

CCTV Inspection Report

EP Barrus
Glen Way
Launton Road
Bicester
OX26 4UR

19/05/2022

Job Number: 397144

Metro Rod (Oxon & West Bucks)

Unit 6, Pear Tree Farm Industrial Estate,
Bicester Road, Marsh Gibbon, Oxon, Oxfordshire, OX27 0GB
Tel: 0808 208 2650

Job Number	Surveyed by (Operator)	Base Unit	Date
397144	**Mark Brownlee**	**LDEH3V4RP4**	**19/05/2022**

Report Contents

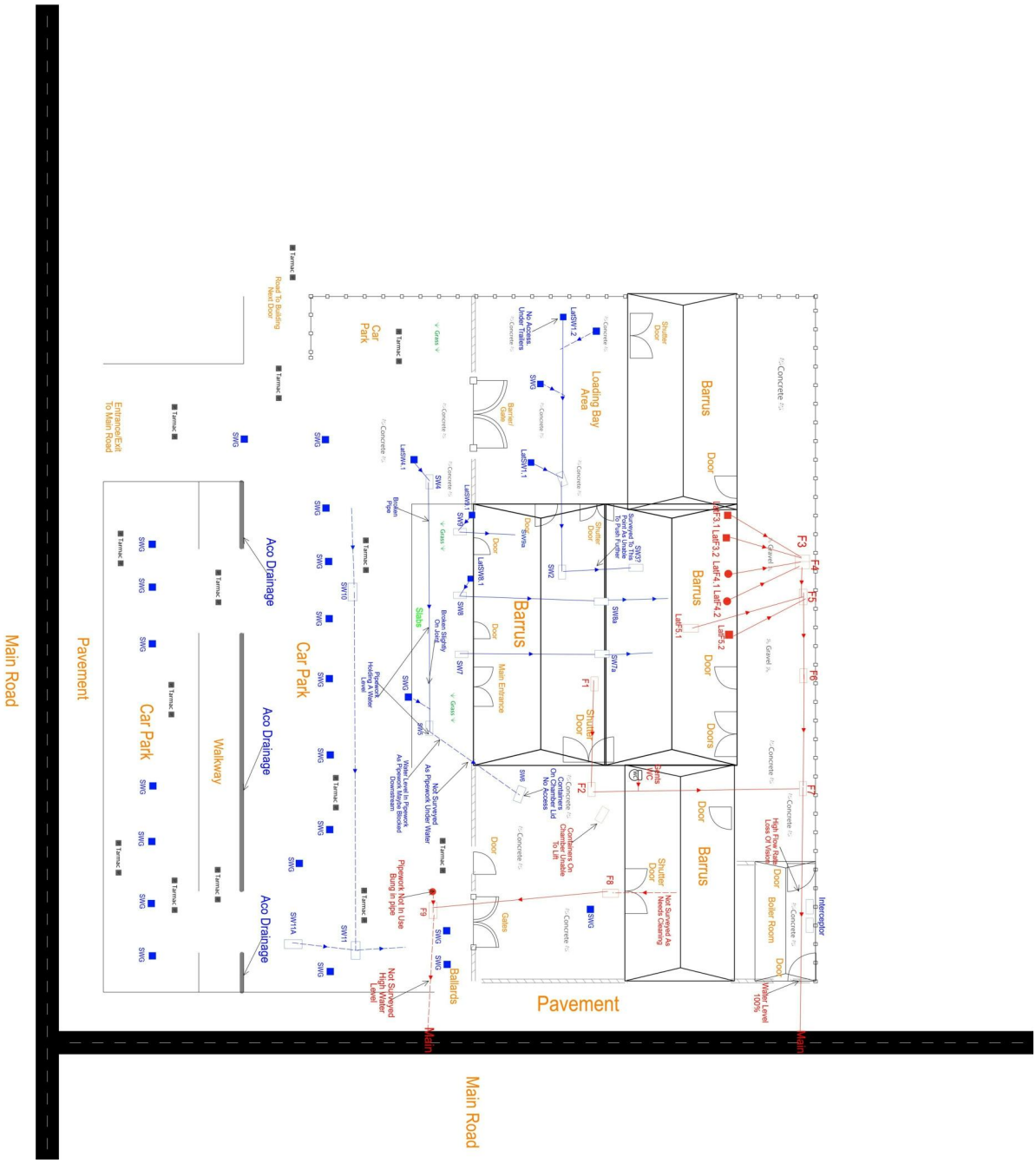
Metro Rod (Oxon & West Bucks)
Unit 6, Pear Tree Farm Industrial Estate
Bicester Road
Marsh Gibbon
Oxon
Oxfordshire
OX27 0GB

Job Number	Surveyed by (Operator)	Base Unit	Date
397144	**Mark Brownlee**	**LDEH3V4RP4**	**19/05/2022**

Report Contents

Job Number	Surveyed by (Operator)	Base Unit	Date
397144	**Mark Brownlee**	**LDEH3V4RP4**	**19/05/2022**

This sketch is not to scale and does not represent the exact routing of the drainage system



Metro Rod (Oxon & West Bucks)
Unit 6, Pear Tree Farm Industrial Estate
Bicester Road
Marsh Gibbon
Oxon
Oxfordshire
OX27 0GB

Site Photos

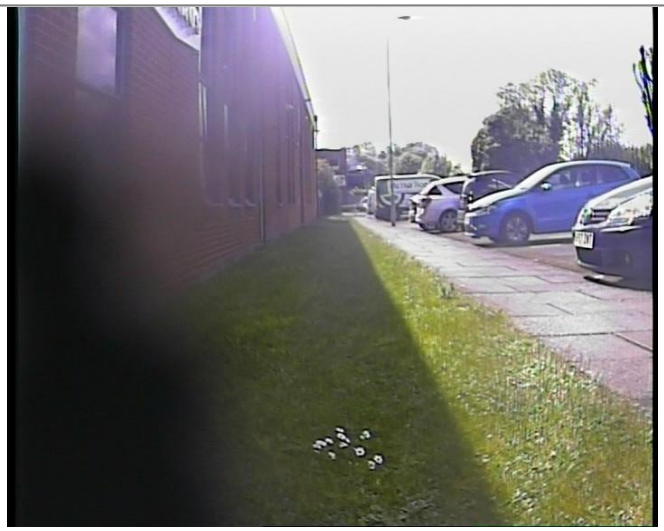
Job Number	Surveyed by (Operator)	Base Unit	Date
397144	**Mark Brownlee**	**LDEH3V4RP4**	**19/05/2022**

Manhole / **Access Point:** SW1 Internal

Manhole / **Access Point:** SW4 Internal

Manhole / **Access Point:** SW5 Internal

Manhole / **Access Point:** SW7 Internal



Manhole / **Access Point:** SW7 Location

Manhole / **Access Point:** SW8 Internal

Site Photos

Metro Rod (Oxon & West Bucks)
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Job Number	Surveyed by (Operator)	Base Unit	Date
397144	**Mark Brownlee**	**LDEH3V4RP4**	**19/05/2022**

Manhole / **Access Point:** SW8 Location

Manhole / **Access Point:** SW9 Internal

Manhole / **Access Point:** SW9 Location

Manhole / **Access Point:** SW4 Location

Manhole / **Access Point:** SW5 Location

Manhole / **Access Point:** F1 Internal

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Job Number	Surveyed by (Operator)	Base Unit	Date
397144	**Mark Brownlee**	**LDEH3V4RP4**	**19/05/2022**

Manhole / **Access Point:** F3 Internal

Manhole / **Access Point:** F4 Internal

Manhole / **Access Point:** F4 Location

Manhole / **Access Point:** F3 Location

Manhole / **Access Point:** F5 Location

Manhole / **Access Point:** F5 Internal

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Site Photos

Job Number	Surveyed by (Operator)	Base Unit	Date
397144	**Mark Brownlee**	**LDEH3V4RP4**	**19/05/2022**

Manhole / **Access Point:** F6 Location

Manhole / **Access Point:** F6 Internal

Manhole / **Access Point:** F7 Internal

Access problems: SW4 - Far left of building

Other Site Photos: Close Up

Other Site Photos: Lobster

Job Number	Surveyed by (Operator)	Base Unit	Date
397144	**Mark Brownlee**	**LDEH3V4RP4**	**19/05/2022**

Other Site Photos: SW6 - Far left of building

Other Site Photos: SW4 - Far left of building

Other Site Photos: Lobster Or Crayfish

Other Site Photos: Crab Or Crayfish

CCTV Inspection Report

Metro Rod (Oxon & West Bucks)
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Surveyed by (Operator)	Job Number	Pipe Length Reference(PLR)	Date	Pre Cleaned
Mark Brownlee	**397144**	**LatSW1.1 X**	**19/05/2022**	**Not Cleaned**
Weather	Customer Present	Service Grade/Structural Grade	Base Unit	Section Number
1 - Dry		**0/0**	**LDEH3V4RP4**	**1**

Road **EP Barrus**
Place **Glen Way**
Location **Launton Road**

Ground Surface **Concrete**
Code List **Drain and Sewer Codes (5th Edition)**
Location Details

Shape/Size **150mm**
Material **Vitrified clay**
Duty **Surface water**

Start MH **SW1**
End MH **LatSW1.1**
Total length **5.84 metres**

Scale **1:0.31**
Direction **Upstream**

Start Node Ref:SW1 | I/L :0.600 metres | Depth: 0.600 metres

Position	Code	Description	Photo	Type/Grade
0.00	MH	Start node type, manhole, reference SW1	6396418	Comment / 0
0.00	WL	Water level 0% height/diameter	6396419	Comment / 0
5.84	GYF	Finish node type, gully, reference LatSW1.1	6396435	Comment / 0

End Node Ref:LatSW1.1 | I/L : metres

CCTV Inspection Photos

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Job Number	Surveyed by (Operator)	Base Unit	Date
397144	**Mark Brownlee**	**LDEH3V4RP4**	**19/05/2022**

SW1 Internal

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Metro Rod (Oxon & West Bucks)
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Surveyed by (Operator)	Job Number	Pipe Length Reference(PLR)	Date	Pre Cleaned
Mark Brownlee	**397144**	**LatSW1.2 X**	**19/05/2022**	**Not Cleaned**
Weather	Customer Present	Service Grade/Structural Grade	Base Unit	Section Number
1 - Dry		**0/0**	**LDEH3V4RP4**	**2**

Road **EP Barrus**
Place **Glen Way**
Location **Launton Road**

Ground Surface **Concrete**
Code List **Drain and Sewer Codes (5th Edition)**
Location Details

Shape/Size **150mm**
Material **Vitrified clay**
Duty **Surface water**

Start MH **SW1**
End MH **LatSW1.2**
Total length **35 metres**

Scale **1:1.84**
Direction **Upstream**

Start Node Ref:SW1 | I/L :0.600 metres | Depth: 0.600 metres

Position	Code	Description	Photo	Type/Grade
0.00	MH	Start node type, manhole, reference SW1	6396448	Comment / 0
0.00	WL	Water level 0% height/diameter	6396449	Comment / 0
24.94	SA	Survey abandoned - Remark: Loss of vision	6396464	Comment / 0

End Node Ref:LatSW1.2 | I/L : metres

CCTV Inspection Photos

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Job Number	Surveyed by (Operator)	Base Unit	Date
397144	**Mark Brownlee**	**LDEH3V4RP4**	**19/05/2022**

SW1 Internal

Survey abandoned - Remark: Loss of vision

CCTV Inspection Report

Metro Rod (Oxon & West Bucks)
Unit 6, Pear Tree Farm Industrial Estate
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Surveyed by (Operator)	Job Number	Pipe Length Reference(PLR)	Date	Pre Cleaned
Mark Brownlee	**397144**	**LatSW1.2 X**	**19/05/2022**	**Not Cleaned**
Weather	Customer Present	Service Grade/Structural Grade	Base Unit	Section Number
1 - Dry		**0/0**	**LDEH3V4RP4**	**3**

Road **EP Barrus**
Place **Glen Way**
Location **Launton Road**

Ground Surface **Concrete**
Code List **Drain and Sewer Codes (5th Edition)**
Location Details

Shape/Size **150mm**
Material **Vitrified clay**
Duty **Surface water**

Start MH **SW1**
End MH **LatSW1.2**
Total length **35 metres**

Scale **1:1.84**
Direction **Upstream**

Start Node Ref:SW1 | I/L :0.600 metres | Depth: 0.600 metres

Position	Code	Description	Photo	Type/Grade
0.00	MH	Start node type, manhole, reference SW1	6396543	Comment / 0
0.00	WL	Water level 0% height/diameter	6396544	Comment / 0
17.30	JN	Junction at 9 o'clock, diameter 150mm	6396545	Comment / 0
26.93	SA	Survey abandoned - Remark: Unable to push further	6396546	Comment / 0

End Node Ref:LatSW1.2 | I/L : metres

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CCTV Inspection Photos

Job Number	Surveyed by (Operator)	Base Unit	Date
397144	**Mark Brownlee**	**LDEH3V4RP4**	**19/05/2022**

SW1 Internal

Survey abandoned - Remark: Unable to push further

CCTV Inspection Report

Metro Rod (Oxon & West Bucks)
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Surveyed by (Operator)	Job Number	Pipe Length Reference(PLR)	Date	Pre Cleaned
Mark Brownlee	**397144**	**SW1 X**	**19/05/2022**	**Not Cleaned**
Weather	Customer Present	Service Grade/Structural Grade	Base Unit	Section Number
1 - Dry		**0/0**	**LDEH3V4RP4**	**4**

Road **EP Barrus**
Place **Glen Way**
Location **Launton Road**

Ground Surface **Concrete**
Code List **Drain and Sewer Codes (5th Edition)**
Location Details

Shape/Size **225mm**
Material **Vitrified clay**
Duty **Surface water**

Start MH **SW1**
End MH **SW2**
Total length **8.88 metres**

Scale **1:0.47**
Direction **Downstream**

Start Node Ref:SW1 | I/L :0.600 metres | Depth: 0.600 metres

Position	Code	Description	Photo	Type/Grade
0.00	MH	Start node type, manhole, reference SW1	6396591	Comment / 0
0.00	WL	Water level 0% height/diameter	6396592	Comment / 0
0.58	WLC (S01)	Clear water level 10% height/diameter, Start	6396600	Comment / 0
2.76	WLC (F01)	Clear water level 10% height/diameter, Finished	6396601	Comment / 0
8.88	MHF	Finish node type, manhole, reference SW2	6396613	Comment / 0

End Node Ref:SW2 | I/L :0.700 metres | Depth: 0.700 metres

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Job Number	Surveyed by (Operator)	Base Unit	Date
397144	**Mark Brownlee**	**LDEH3V4RP4**	**19/05/2022**

SW1 Internal

CCTV Inspection Report

Metro Rod (Oxon & West Bucks)
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Surveyed by (Operator)	Job Number	Pipe Length Reference(PLR)	Date	Pre Cleaned
Mark Brownlee	**397144**	**SW2 X**	**19/05/2022**	**Not Cleaned**
Weather	Customer Present	Service Grade/Structural Grade	Base Unit	Section Number
1 - Dry		**0/0**	**LDEH3V4RP4**	**5**

Road **EP Barrus**
Place **Glen Way**
Location **Launton Road**

Ground Surface **Concrete**
Code List **Drain and Sewer Codes (5th Edition)**
Location Details

Shape/Size **225mm**
Material **Vitrified clay**
Duty **Surface water**

Start MH **SW2**
End MH **SW3**
Total length **10 metres**

Scale **1:0.52**
Direction **Downstream**

Start Node Ref:SW2 | I/L :0.700 metres | Depth: 0.700 metres

Position	Code	Description	Photo	Type/Grade
0.00	MH	Start node type, manhole, reference SW2	6396617	Comment / 0
0.00	WL	Water level 0% height/diameter	6396618	Comment / 0
5.44	SA	Survey abandoned - Remark: Unable to push further	6396629	Comment / 0

End Node Ref:SW3 | I/L : metres

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Job Number	Surveyed by (Operator)	Base Unit	Date
397144	**Mark Brownlee**	**LDEH3V4RP4**	**19/05/2022**

Survey abandoned - Remark: Unable to push further

CCTV Inspection Report

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Surveyed by (Operator)	Job Number	Pipe Length Reference(PLR)	Date	Pre Cleaned
Mark Brownlee	**397144**	**LatSW4.1 X**	**19/05/2022**	**Not Cleaned**
Weather	Customer Present	Service Grade/Structural Grade	Base Unit	Section Number
1 - Dry		**0/0**	**LDEH3V4RP4**	**6**

Road **EP Barrus**
Place **Glen Way**
Location **Launton Road**

Ground Surface **Concrete**
Code List **Drain and Sewer Codes (5th Edition)**
Location Details

Shape/Size **150mm**
Material **Vitrified clay**
Duty **Surface water**

Start MH **SW4**
End MH **LatSW4.1**
Total length **1.44 metres**

Scale **1:0.08**
Direction **Upstream**

Start Node Ref:SW4 | I/L :0.800 metres | Depth: 0.800 metres

Position	Code	Description	Photo	Type/Grade
0.00	MH	Start node type, manhole, reference SW4	6397789	Comment / 0
0.00	WL	Water level 0% height/diameter	6397790	Comment / 0
0.15	LL	Line of drain/sewer deviates left	6397791	Comment / 0
1.44	GYF	Finish node type, gully, reference LatSW4.1	6397794	Comment / 0

End Node Ref:LatSW4.1 | I/L : metres

CCTV Inspection Photos

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Job Number	Surveyed by (Operator)	Base Unit	Date
397144	**Mark Brownlee**	**LDEH3V4RP4**	**19/05/2022**

SW4 Location

SW4 Internal

CCTV Inspection Report

Metro Rod (Oxon & West Bucks)
Unit 6, Pear Tree Farm Industrial Estate
Bicester Road
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Surveyed by (Operator)	Job Number	Pipe Length Reference(PLR)	Date	Pre Cleaned
Mark Brownlee	**397144**	**SW4 X**	**19/05/2022**	**Not Cleaned**
Weather	Customer Present	Service Grade/Structural Grade	Base Unit	Section Number
1 - Dry		**2/4**	**LDEH3V4RP4**	**7**

Road **EP Barrus**
Place **Glen Way**
Location **Launton Road**

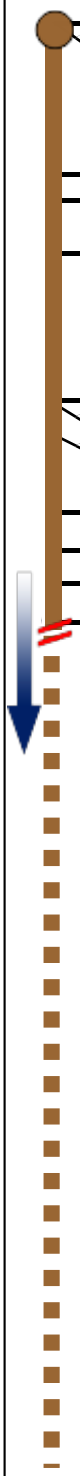
Ground Surface **Concrete**
Code List **Drain and Sewer Codes (5th Edition)**
Location Details

Shape/Size **150mm**
Material **Vitrified clay**
Duty **Surface water**

Start MH **SW4**
End MH **SW5**
Total length **60 metres**

Scale **1:3.15**
Direction **Downstream**

Start Node Ref:SW4 | I/L :0.800 metres | Depth: 0.800 metres



Position	Code	Description	Photo	Type/Grade
0.00	MH	Start node type, manhole, reference SW4	6397806	Comment / 0
0.00	WL	Water level 0% height/diameter	6397807	Comment / 0
6.26	BJ	Broken pipe at 7 o'clock, at joint	6397828	Structural / 4
7.32	DEX (S03)	Other settled deposits 5% cross-sectional area loss - Remark: Slit, Start	6398160	Service / 2
9.56	WLC	Clear water level 5% height/diameter	6398172	Comment / 0
15.69	WLC (S01)	Clear water level 5% height/diameter, Start	6397850	Comment / 0
15.88	OJM	Open joint medium	6398184	Structural / 1
17.20	OJL	Open joint large	6397869	Structural / 1
20.37	OJM	Open joint medium	6398210	Structural / 1
21.93	OJM	Open joint medium	6398214	Structural / 1
23.33	WLC (F01)	Clear water level 5% height/diameter, Finished	6397874	Comment / 0
24.92	SA	Survey abandoned - Remark: Unable To Push Further	6397931	Comment / 0

End Node Ref:SW5 | I/L :0.900 metres | Depth: 0.900 metres

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CCTV Inspection Photos

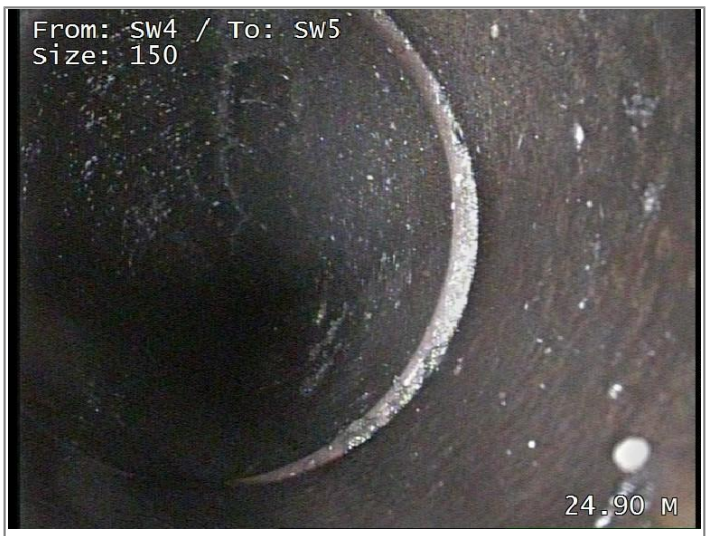
Job Number	Surveyed by (Operator)	Base Unit	Date
397144	**Mark Brownlee**	**LDEH3V4RP4**	**19/05/2022**

SW4 Location

SW4 Internal

Broken pipe at 7 o'clock, at joint

Other settled deposits 5% cross-sectional area loss - Remark: Slit, Start



Survey abandoned - Remark: Unable To Push Further

SW5 Internal

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Job Number	Surveyed by (Operator)	Base Unit	Date
397144	**Mark Brownlee**	**LDEH3V4RP4**	**19/05/2022**

SW5 Location

CCTV Inspection Report

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Surveyed by (Operator)	Job Number	Pipe Length Reference(PLR)	Date	Pre Cleaned
Mark Brownlee	**397144**	**SW4 X**	**19/05/2022**	**Not Cleaned**
Weather	Customer Present	Service Grade/Structural Grade	Base Unit	Section Number
1 - Dry		**0/4**	**LDEH3V4RP4**	**8**

Road **EP Barrus**
Place **Glen Way**
Location **Launton Road**

Ground Surface **Concrete**
Code List **Drain and Sewer Codes (5th Edition)**
Location Details

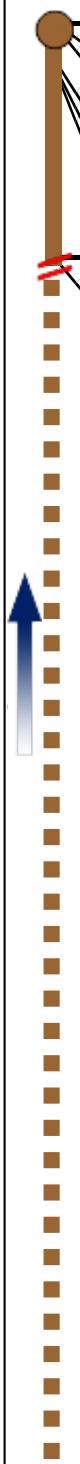
Shape/Size **150mm**
Material **Vitrified clay**
Duty **Surface water**

Start MH **SW5**
End MH **SW4**
Total length **60 metres**

Scale **1:3.15**
Direction **Upstream**

Start Node Ref:SW5 | I/L :0.900 metres | Depth: 0.900 metres

Position	Code	Description	Photo	Type/Grade
0.00	MH	Start node type, manhole, reference SW5	6398251	Comment / 0
0.00	WL	Water level 100% height/diameter	6398253	Comment / 0
0.00	CUW (S01)	Loss of vision, camera under water - Remark: Due to Downstream pipe work under water , Start	6398259	Comment / 0
1.42	JN	Junction at 9 o'clock, diameter 150mm	6398269	Comment / 0
1.62	JDM	Joint displaced medium - Remark: Break on joint	6398270	Structural / 1
1.64	BJ	Broken pipe at 8 o'clock, at joint	6398274	Structural / 4
9.72	CUW (F01)	Loss of vision, camera under water - Remark: Due to Downstream pipework under water , Finished	6398278	Comment / 0
9.72	SA	Survey abandoned - Remark: Loss Of Picture	6398279	Comment / 0



End Node Ref:SW4 | I/L :0.800 metres | Depth: 0.800 metres

CCTV Inspection Photos

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Job Number	Surveyed by (Operator)	Base Unit	Date
397144	**Mark Brownlee**	**LDEH3V4RP4**	**19/05/2022**

SW5 Location

SW5 Internal

Broken pipe at 8 o'clock, at joint

Survey abandoned - Remark: Loss Of Picture

SW4 Internal

SW4 Location

CCTV Inspection Report

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Surveyed by (Operator)	Job Number	Pipe Length Reference(PLR)	Date	Pre Cleaned
Mark Brownlee	**397144**	**SW7**	**19/05/2022**	**Not Cleaned**
Weather	Customer Present	Service Grade/Structural Grade	Base Unit	Section Number
1 - Dry		**3/0**	**LDEH3V4RP4**	**9**

Road **EP Barrus**
Place **Glen Way**
Location **Launton Road**

Ground Surface **Grass**
Code List **Drain and Sewer Codes (5th Edition)**
Location Details

Shape/Size **150mm**
Material **Vitrified clay**
Duty **Surface water**

Start MH **SW7**
End MH **SW7a**
Total length **50 metres**

Scale **1:2.62**
Direction **Downstream**

Start Node Ref:SW7 | I/L :0.300 metres | Depth: 0.300 metres

Position	Code	Description	Photo	Type/Grade
0.00	MH	Start node type, manhole, reference SW7	6398850	Comment / 0
0.00	WL	Water level 0% height/diameter	6398853	Comment / 0
9.15	DEX (S01)	Other settled deposits 10% cross-sectional area loss - Remark: Slit, Start	6398858	Service / 3
11.42	JN	Junction at 9 o'clock, diameter 150mm	6398865	Comment / 0
25.13	DEX (F01)	Other settled deposits 10% cross-sectional area loss - Remark: Slit, Finished	6398880	Service / 3
25.13	SA	Survey abandoned - Remark: Unable To Push Further	6398887	Comment / 0

End Node Ref:SW7a | I/L : metres

CCTV Inspection Photos

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Job Number	Surveyed by (Operator)	Base Unit	Date
397144	**Mark Brownlee**	**LDEH3V4RP4**	**19/05/2022**

SW7 Location

SW7 Internal

Other settled deposits 10% cross-sectional area loss - Remark: Slit, Start

Other settled deposits 10% cross-sectional area loss - Remark: Slit, Finished

Survey abandoned - Remark: Unable To Push Further

CCTV Inspection Report

Metro Rod (Oxon & West Bucks)
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Surveyed by (Operator)	Job Number	Pipe Length Reference(PLR)	Date	Pre Cleaned
Mark Brownlee	**397144**	**LatSW8.1 X**	**19/05/2022**	**Not Cleaned**
Weather	Customer Present	Service Grade/Structural Grade	Base Unit	Section Number
1 - Dry		**0/0**	**LDEH3V4RP4**	**10**

Road **EP Barrus**
Place **Glen Way**
Location **Launton Road**

Ground Surface **Grass**
Code List **Drain and Sewer Codes (5th Edition)**
Location Details

Shape/Size **100mm**
Material **UPVC**
Duty **Surface water**

Start MH **SW8**
End MH **LatSW8.1**
Total length **1.75 metres**

Scale **1:0.09**
Direction **Upstream**

Start Node Ref:SW8 | I/L :0.600 metres | Depth: 0.600 metres

Position	Code	Description	Photo	Type/Grade
0.00	MH	Start node type, manhole, reference SW8	6399044	Comment / 0
0.00	WL	Water level 0% height/diameter	6399045	Comment / 0
0.30	LR	Line of drain/sewer deviates right	6399047	Comment / 0
1.75	GYF	Finish node type, gully, reference LatSW8.1	6399049	Comment / 0

End Node Ref:LatSW8.1 | I/L : metres

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CCTV Inspection Photos

Job Number	Surveyed by (Operator)	Base Unit	Date
397144	**Mark Brownlee**	**LDEH3V4RP4**	**19/05/2022**

SW8 Location

SW8 Internal

CCTV Inspection Report

Metro Rod (Oxon & West Bucks)
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Surveyed by (Operator)	Job Number	Pipe Length Reference(PLR)	Date	Pre Cleaned
Mark Brownlee	**397144**	**SW8**	**19/05/2022**	**Not Cleaned**
Weather	Customer Present	Service Grade/Structural Grade	Base Unit	Section Number
1 - Dry		**2/1**	**LDEH3V4RP4**	**11**

Road **EP Barrus**
Place **Glen Way**
Location **Launton Road**

Ground Surface **Grass**
Code List **Drain and Sewer Codes (5th Edition)**
Location Details

Shape/Size **150mm**
Material **Vitrified clay**
Duty **Surface water**

Start MH **SW8**
End MH **SW8a**
Total length **40 metres**

Scale **1:2.10**
Direction **Downstream**

Start Node Ref:SW8 | I/L :0.600 metres | Depth: 0.600 metres

Position	Code	Description	Photo	Type/Grade
0.00	MH	Start node type, manhole, reference SW8	6399059	Comment / 0
0.00	WL	Water level 0% height/diameter	6399060	Comment / 0
3.47	DEX (S01)	Other settled deposits 5% cross-sectional area loss - Remark: Silt/Stones, Start	6399067	Service / 2
3.52	JDM	Joint displaced medium	6399073	Structural / 1
7.21	WLC (S02)	Clear water level 5% height/diameter, Start	6399085	Comment / 0
7.62	DEX (F01)	Other settled deposits 5% cross-sectional area loss - Remark: Silt/Stones, Finished	6399088	Service / 2
7.64	WLC	Clear water level 25% height/diameter	6399087	Comment / 0
7.78	JDM	Joint displaced medium	6399097	Structural / 1
7.78	WLC	Clear water level 50% height/diameter	6399098	Comment / 0
7.78	WLC (F02)	Clear water level 5% height/diameter, Finished	6399100	Comment / 0
8.10	WLC	Clear water level 10% height/diameter	6399108	Comment / 0
10.30	DES (S03)	Settled deposits fine 5% cross-sectional area loss, Start	6399121	Service / 2
12.10	DES (F03)	Settled deposits fine 5% cross-sectional area loss, Finished	6399123	Service / 2
16.31	DEX	Other settled deposits 5% cross-sectional area loss - Remark: Silt	6399151	Service / 2
17.47	WLC (S04)	Clear water level 5% height/diameter, Start	6399158	Comment / 0
19.24	WLC (F04)	Clear water level 5% height/diameter, Finished	6399159	Comment / 0
24.92	DES	Settled deposits fine 5% cross-sectional area loss	6399179	Service / 2
24.92	SA	Survey abandoned - Remark: Unable to push further	6399181	Comment / 0

End Node Ref:SW8a | I/L : metres

Job Number	Surveyed by (Operator)	Base Unit	Date
397144	**Mark Brownlee**	**LDEH3V4RP4**	**19/05/2022**

SW8 Location

SW8 Internal

Other settled deposits 5% cross-sectional area loss - Remark: Silt/Stones, Start

Other settled deposits 5% cross-sectional area loss - Remark: Silt/Stones, Finished

Settled deposits fine 5% cross-sectional area loss, Start

Settled deposits fine 5% cross-sectional area loss, Finished

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Other settled deposits 5% cross-sectional area loss - Remark: Silt

Settled deposits fine 5% cross-sectional area loss

Survey abandoned - Remark: Unable to push further

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Surveyed by (Operator)	Job Number	Pipe Length Reference(PLR)	Date	Pre Cleaned
Mark Brownlee	**397144**	**LatSW9.1 X**	**19/05/2022**	**Not Cleaned**
Weather	Customer Present	Service Grade/Structural Grade	Base Unit	Section Number
1 - Dry		**3/0**	**LDEH3V4RP4**	**12**

Road **EP Barrus**
Place **Glen Way**
Location **Launton Road**

Ground Surface **Grass**
Code List **Drain and Sewer Codes (5th Edition)**
Location Details

Shape/Size **100mm**
Material **UPVC**
Duty **Surface water**

Start MH **SW9**
End MH **LatSW9.1**
Total length **2.38 metres**

Scale **1:0.12**
Direction **Upstream**

Start Node Ref:SW9 | I/L :0.600 metres | Depth: 0.600 metres

Position	Code	Description	Photo	Type/Grade
0.00	MH	Start node type, manhole, reference SW9	6399350	Comment / 0
0.00	WL	Water level 0% height/diameter	6399351	Comment / 0
0.63	LR	Line of drain/sewer deviates right	6399352	Comment / 0
2.38	DEC	Settled deposits hard or compacted 10% cross-sectional area loss	6399353	Service / 3
2.38	GYF	Finish node type, gully, reference LatSW9.1	6399354	Comment / 0

End Node Ref:LatSW9.1 | I/L : metres

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Job Number	Surveyed by (Operator)	Base Unit	Date
397144	**Mark Brownlee**	**LDEH3V4RP4**	**19/05/2022**

SW9 Location

SW9 Internal

Settled deposits hard or compacted 10% cross-sectional area loss

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Surveyed by (Operator)	Job Number	Pipe Length Reference(PLR)	Date	Pre Cleaned
Mark Brownlee	**397144**	**SW9**	**19/05/2022**	**Not Cleaned**
Weather	Customer Present	Service Grade/Structural Grade	Base Unit	Section Number
1 - Dry		**3/1**	**LDEH3V4RP4**	**13**

Road **EP Barrus**
Place **Glen Way**
Location **Launton Road**

Ground Surface **Grass**
Code List **Drain and Sewer Codes (5th Edition)**
Location Details

Shape/Size **150mm**
Material **Vitrified clay**
Duty **Surface water**

Start MH **SW9**
End MH **SW9a**
Total length **40 metres**

Scale **1:2.10**
Direction **Downstream**

Start Node Ref:SW9 | I/L :0.600 metres | Depth: 0.600 metres

Position	Code	Description	Photo	Type/Grade
0.00	MH	Start node type, manhole, reference SW9	6399364	Comment / 0
0.00	WL	Water level 0% height/diameter	6399365	Comment / 0
7.49	JN	Junction at 9 o'clock, diameter 150mm	6399369	Comment / 0
7.74	WLC (S01)	Clear water level 5% height/diameter, Start	6399370	Comment / 0
8.29	DES (S02)	Settled deposits fine 10% cross-sectional area loss, Start	6399376	Service / 3
9.33	DES (F02)	Settled deposits fine 10% cross-sectional area loss, Finished	6399377	Service / 3
9.54	REM	Bolt in pipe	6399381	Comment / 0
12.65	WLC (F01)	Clear water level 5% height/diameter, Finished	6399382	Comment / 0
13.99	WLC (S03)	Clear water level 5% height/diameter, Start	6399388	Comment / 0
14.35	JDM	Joint displaced medium	6399391	Structural / 1
15.57	DES (S04)	Settled deposits fine 5% cross-sectional area loss, Start	6399399	Service / 2
17.31	DES (F04)	Settled deposits fine 5% cross-sectional area loss, Finished	6399404	Service / 2
17.83	WLC (F03)	Clear water level 5% height/diameter, Finished	6399405	Comment / 0
18.61	DES (S05)	Settled deposits fine 5% cross-sectional area loss, Start	6399409	Service / 2
19.26	DES (F05)	Settled deposits fine 5% cross-sectional area loss, Finished	6399411	Service / 2
19.26	SA	Survey abandoned - Remark: Loss of vision	6399413	Comment / 0

End Node Ref:SW9a | I/L : metres

Job Number	Surveyed by (Operator)	Base Unit	Date
397144	**Mark Brownlee**	**LDEH3V4RP4**	**19/05/2022**

SW9 Location

SW9 Internal

Settled deposits fine 10% cross-sectional area loss, Start

Settled deposits fine 10% cross-sectional area loss, Finished

Bolt in pipe

Settled deposits fine 5% cross-sectional area loss, Start

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Job Number	Surveyed by (Operator)	Base Unit	Date
397144	**Mark Brownlee**	**LDEH3V4RP4**	**19/05/2022**

Settled deposits fine 5% cross-sectional area loss, Finished

Settled deposits fine 5% cross-sectional area loss, Start

Settled deposits fine 5% cross-sectional area loss, Finished

Survey abandoned - Remark: Loss of vision

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Surveyed by (Operator)	Job Number	Pipe Length Reference(PLR)	Date	Pre Cleaned
Mark Brownlee	**397144**	**F1 X**	**19/05/2022**	**Not Cleaned**
Weather	Customer Present	Service Grade/Structural Grade	Base Unit	Section Number
1 - Dry		**0/0**	**LDEH3V4RP4**	**14**

Road **EP Barrus**
Place **Glen Way**
Location **Launton Road**

Ground Surface **Concrete**
Code List **Drain and Sewer Codes (5th Edition)**
Location Details

Shape/Size **150mm**
Material **Vitrified clay**
Duty **Foul**

Start MH **F2**
End MH **F1**
Total length **32.81 metres**

Scale **1:1.72**
Direction **Upstream**

Start Node Ref:F2 | I/L :0.600 metres | Depth: 0.800 metres

Position	Code	Description	Photo	Type/Grade
0.00	MH	Start node type, manhole, reference F2	6400837	Comment / 0
0.00	WL	Water level 10% height/diameter	6400838	Comment / 0
32.81	REM	Water level throughout pipe work due to constant flow	6400860	Comment / 0
32.81	MHF	Finish node type, manhole, reference F1	6400861	Comment / 0

End Node Ref:F1 | I/L :0.800 metres | Depth: 0.800 metres

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Job Number	Surveyed by (Operator)	Base Unit	Date
397144	**Mark Brownlee**	**LDEH3V4RP4**	**19/05/2022**

Water level throughout pipe work due to constant flow

F1 Internal

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Surveyed by (Operator)	Job Number	Pipe Length Reference(PLR)	Date	Pre Cleaned
Mark Brownlee	**397144**	**F2 X**	**19/05/2022**	**Not Cleaned**
Weather	Customer Present	Service Grade/Structural Grade	Base Unit	Section Number
1 - Dry		**2/0**	**LDEH3V4RP4**	**15**

Road **EP Barrus**
Place **Glen Way**
Location **Launton Road**

Ground Surface **Concrete**
Code List **Drain and Sewer Codes (5th Edition)**
Location Details

Shape/Size **150mm**
Material **Vitrified clay**
Duty **Foul**

Start MH **F2**
End MH **F7**
Total length **50 metres**

Scale **1:2.62**
Direction **Downstream**

Start Node Ref:F2 | I/L :0.800 metres | Depth: 0.800 metres

Position	Code	Description	Photo	Type/Grade
0.00	MH	Start node type, manhole, reference F2	6400874	Comment / 0
0.00	WL	Water level 0% height/diameter	6400875	Comment / 0
0.70	WLC (S01)	Clear water level 5% height/diameter, Start	6400876	Comment / 0
9.15	JN	Junction at 11 o'clock, diameter 150mm	6400883	Comment / 0
9.15	FW	Flow from incoming pipe, at 11 o'clock 10% of the vertical dimension	6400886	Comment / 0
9.38	DEZ	Other attached deposits at 10 o'clock 5% cross-sectional area loss - Remark Scale	6400888	Service / 2
39.00	WLC (F01)	Clear water level 5% height/diameter, Finished	6400909	Comment / 0
39.00	SA	Survey abandoned - Remark: Out of reel	6400918	Comment / 0

End Node Ref:F7 | I/L :1.650 metres | Depth: 1.650 metres

Job Number	Surveyed by (Operator)	Base Unit	Date
397144	**Mark Brownlee**	**LDEH3V4RP4**	**19/05/2022**

Other attached deposits at 10 o'clock 5% cross-sectional area loss - Remark Scale

Survey abandoned - Remark: Out of reel

F7 Internal

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Surveyed by (Operator)	Job Number	Pipe Length Reference(PLR)	Date	Pre Cleaned
Mark Brownlee	**397144**	**LatF3.1 X**	**19/05/2022**	**Not Cleaned**
Weather	Customer Present	Service Grade/Structural Grade	Base Unit	Section Number
1 - Dry		**2/1**	**LDEH3V4RP4**	**16**

Road **EP Barrus**
Place **Glen Way**
Location **Launton Road**

Ground Surface **Gravel**
Code List **Drain and Sewer Codes (5th Edition)**
Location Details

Shape/Size **100mm**
Material **Vitrified clay**
Duty **Foul**

Start MH **F3**
End MH **LatF3.1**
Total length **2.04 metres**

Scale **1:0.11**
Direction **Upstream**

Start Node Ref:F3 | I/L :0.610 metres | Depth: 0.610 metres

Position	Code	Description	Photo	Type/Grade
0.00	MH	Start node type, manhole, reference F3	6400988	Comment / 0
0.00	WL	Water level 0% height/diameter	6400989	Comment / 0
0.11	OJM	Open joint medium	6400993	Structural / 1
0.70	DES (S01)	Settled deposits fine 5% cross-sectional area loss, Start	6400995	Service / 2
2.02	DES (F01)	Settled deposits fine 5% cross-sectional area loss, Finished	6400996	Service / 2
2.04	GYF	Finish node type, gully, reference LatF3.1	6400997	Comment / 0

End Node Ref:LatF3.1 | I/L : metres

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Job Number	Surveyed by (Operator)	Base Unit	Date
397144	**Mark Brownlee**	**LDEH3V4RP4**	**19/05/2022**

F3 Location

F3 Internal

Settled deposits fine 5% cross-sectional area loss, Start

Settled deposits fine 5% cross-sectional area loss, Finished

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Surveyed by (Operator)	Job Number	Pipe Length Reference(PLR)	Date	Pre Cleaned
Mark Brownlee	**397144**	**LatF3.2 X**	**19/05/2022**	**Not Cleaned**
Weather	Customer Present	Service Grade/Structural Grade	Base Unit	Section Number
1 - Dry		**0/1**	**LDEH3V4RP4**	**17**

Road **EP Barrus**
Place **Glen Way**
Location **Launton Road**

Ground Surface **Gravel**
Code List **Drain and Sewer Codes (5th Edition)**
Location Details

Shape/Size **100mm**
Material **Vitrified clay**
Duty **Foul**

Start MH **F3**
End MH **LatF3.2**
Total length **2.86 metres**

Scale **1:0.15**
Direction **Upstream**

Start Node Ref:F3 | I/L :0.610 metres | Depth: 0.610 metres

Position	Code	Description	Photo	Type/Grade
0.00	MH	Start node type, manhole, reference F3	6401017	Comment / 0
0.00	WL	Water level 0% height/diameter	6401018	Comment / 0
1.23	JDM	Joint displaced medium	6401019	Structural / 1
2.36	OJM	Open joint medium	6401025	Structural / 1
2.36	LR	Line of drain/sewer deviates right	6401026	Comment / 0
2.86	GYF	Finish node type, gully, reference LatF3.2	6401031	Comment / 0

End Node Ref:LatF3.2 | I/L : metres

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Job Number	Surveyed by (Operator)	Base Unit	Date
397144	**Mark Brownlee**	**LDEH3V4RP4**	**19/05/2022**

F3 Location

F3 Internal

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Surveyed by (Operator)	Job Number	Pipe Length Reference(PLR)	Date	Pre Cleaned
Mark Brownlee	**397144**	**LatF4.1 X**	**19/05/2022**	**Not Cleaned**
Weather	Customer Present	Service Grade/Structural Grade	Base Unit	Section Number
1 - Dry		**0/2**	**LDEH3V4RP4**	**18**

Road **EP Barrus**
Place **Glen Way**
Location **Launton Road**

Ground Surface **Gravel**
Code List **Drain and Sewer Codes (5th Edition)**
Location Details

Shape/Size **100mm**
Material **Vitrified clay**
Duty **Foul**

Start MH **F4**
End MH **LatF4.1**
Total length **3.68 metres**

Scale **1:0.19**
Direction **Upstream**

Start Node Ref:F4 | I/L :0.610 metres | Depth: 0.610 metres

Position	Code	Description	Photo	Type/Grade
0.00	MH	Start node type, manhole, reference F4	6401074	Comment / 0
0.00	WL	Water level 0% height/diameter	6401075	Comment / 0
0.03	CC	Crack circumferential from 9 to 5 o'clock	6401076	Structural / 2
3.36	LU	Line of drain/sewer deviates up	6401077	Comment / 0
3.68	BRF	Finish node type, major connection without manhole, reference LatF4.1	6401078	Comment / 0

End Node Ref:LatF4.1 | I/L : metres

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Job Number	Surveyed by (Operator)	Base Unit	Date
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F4 Location

F4 Internal

Crack circumferential from 9 to 5 o'clock

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Surveyed by (Operator)	Job Number	Pipe Length Reference(PLR)	Date	Pre Cleaned
Mark Brownlee	**397144**	**LatF4.2 X**	**19/05/2022**	**Not Cleaned**
Weather	Customer Present	Service Grade/Structural Grade	Base Unit	Section Number
1 - Dry		**0/0**	**LDEH3V4RP4**	**19**

Road **EP Barrus**
Place **Glen Way**
Location **Launton Road**

Ground Surface **Gravel**
Code List **Drain and Sewer Codes (5th Edition)**
Location Details

Shape/Size **100mm**
Material **Vitrified clay**
Duty **Foul**

Start MH **F4**
End MH **LatF4.2**
Total length **4.58 metres**

Scale **1:0.24**
Direction **Upstream**

Start Node Ref:F4 | I/L :0.610 metres | Depth: 0.610 metres

Position	Code	Description	Photo	Type/Grade
0.00	MH	Start node type, manhole, reference F4	6401085	Comment / 0
0.00	WL	Water level 0% height/diameter	6401086	Comment / 0
4.28	LU	Line of drain/sewer deviates up	6401087	Comment / 0
4.58	BRF	Finish node type, major connection without manhole, reference LatF4.2	6401088	Comment / 0

End Node Ref:LatF4.2 | I/L : metres

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397144	**Mark Brownlee**	**LDEH3V4RP4**	**19/05/2022**

F4 Location

F4 Internal

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Surveyed by (Operator)	Job Number	Pipe Length Reference(PLR)	Date	Pre Cleaned
Mark Brownlee	**397144**	**F4 X**	**19/05/2022**	**Not Cleaned**
Weather	Customer Present	Service Grade/Structural Grade	Base Unit	Section Number
1 - Dry		**0/0**	**LDEH3V4RP4**	**20**

Road **EP Barrus**
Place **Glen Way**
Location **Launton Road**

Ground Surface **Gravel**
Code List **Drain and Sewer Codes (5th Edition)**
Location Details

Shape/Size **100mm**
Material **Vitrified clay**
Duty **Foul**

Start MH **F4**
End MH **F5**
Total length **0.44 metres**

Scale **1:0.02**
Direction **Downstream**

Start Node Ref:F4 | I/L :0.610 metres | Depth: 0.610 metres

Position	Code	Description	Photo	Type/Grade
0.00	MH	Start node type, manhole, reference F4	6401092	Comment / 0
0.00	WL	Water level 0% height/diameter	6401093	Comment / 0
0.44	MHF	Finish node type, manhole, reference F5	6401094	Comment / 0

End Node Ref:F5 | I/L :0.700 metres | Depth: 0.700 metres

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Job Number	Surveyed by (Operator)	Base Unit	Date
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F4 Location

F4 Internal

F5 Internal

F5 Location

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Surveyed by (Operator)	Job Number	Pipe Length Reference(PLR)	Date	Pre Cleaned
Mark Brownlee	**397144**	**F8 X**	**20/05/2022**	**Not Cleaned**
Weather	Customer Present	Service Grade/Structural Grade	Base Unit	Section Number
1 - Dry		**4/0**	**LDEH3V4RP4**	**21**

Road **EP Barrus**
Place **Glen Way**
Location **Launton Road**

Ground Surface **Tarmac**
Code List **Drain and Sewer Codes (5th Edition)**
Location Details

Shape/Size **150mm**
Material **Vitrified clay**
Duty **Foul**

Start MH **F9**
End MH **F8**
Total length **19.77 metres**

Scale **1:1.04**
Direction **Upstream**

Start Node Ref:F9 | I/L :1.880 metres | Depth: 1.880 metres

Position	Code	Description	Photo	Type/Grade
0.00	MH	Start node type, manhole, reference F12	6402236	Comment / 0
0.00	WL	Water level 10% height/diameter	6402237	Comment / 0
0.54	WLT (S01)	Turbid water level 10% height/diameter, Start	6402238	Comment / 0
19.77	DEZ	Other attached deposits from 8 to 4 o'clock 25% cross-sectional area loss - Remark Scale	6402266	Service / 4
19.77	WLT (F01)	Turbid water level 10% height/diameter, Finished	6402267	Comment / 0
19.77	MHF	Finish node type, manhole, reference F11	6402268	Comment / 0

End Node Ref:F8 | I/L :1.800 metres | Depth: 1.800 metres

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Job Number	Surveyed by (Operator)	Base Unit	Date
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Other attached deposits from 8 to 4 o'clock 25% cross-sectional area loss - Remark Scale

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Surveyed by (Operator)	Job Number	Pipe Length Reference(PLR)	Date	Pre Cleaned
Mark Brownlee	**397144**	**LatF5.1 X**	**20/05/2022**	**Not Cleaned**
Weather	Customer Present	Service Grade/Structural Grade	Base Unit	Section Number
1 - Dry		**3/0**	**LDEH3V4RP4**	**22**

Road **EP Barrus**
Place **Glen Way**
Location **Launton Road**

Ground Surface **Gravel**
Code List **Drain and Sewer Codes (5th Edition)**
Location Details

Shape/Size **100mm**
Material **Vitrified clay**
Duty **Foul**

Start MH **F5**
End MH **LatF5.1**
Total length **4.87 metres**

Scale **1:0.26**
Direction **Upstream**

Start Node Ref:F5 | I/L :0.700 metres | Depth: 0.700 metres

Position	Code	Description	Photo	Type/Grade
0.00	MH	Start node type, manhole, reference F5	6403053	Comment / 0
0.00	WL	Water level 0% height/diameter	6403055	Comment / 0
0.99	DESJ	Settled deposits fine 10% cross-sectional area loss, at joint	6403056	Service / 3
1.04	JN	Junction at 3 o'clock, diameter 100mm	6403057	Comment / 0
4.87	MHF	Finish node type, manhole, reference LatF5.1	6403058	Comment / 0

End Node Ref:LatF5.1 | I/L :0.600 metres | Depth: 0.600 metres

Job Number	Surveyed by (Operator)	Base Unit	Date
397144	**Mark Brownlee**	**LDEH3V4RP4**	**20/05/2022**

F5 Location

F5 Internal

Settled deposits fine 10% cross-sectional area loss, at joint

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Surveyed by (Operator)	Job Number	Pipe Length Reference(PLR)	Date	Pre Cleaned
Mark Brownlee	**397144**	**LatF5.2 X**	**20/05/2022**	**Not Cleaned**
Weather	Customer Present	Service Grade/Structural Grade	Base Unit	Section Number
1 - Dry		**0/0**	**LDEH3V4RP4**	**23**

Road **EP Barrus**
Place **Glen Way**
Location **Launton Road**

Ground Surface **Gravel**
Code List **Drain and Sewer Codes (5th Edition)**
Location Details

Shape/Size **100mm**
Material **Vitrified clay**
Duty **Foul**

Start MH **F5**
End MH **LatF5.2**
Total length **1.8 metres**

Scale **1:0.09**
Direction **Upstream**

Start Node Ref:F5 | I/L :0.700 metres | Depth: 0.700 metres

Position	Code	Description	Photo	Type/Grade
0.00	MH	Start node type, manhole, reference F5	6403101	Comment / 0
0.00	WL	Water level 0% height/diameter	6403102	Comment / 0
1.80	GYF	Finish node type, gully, reference LatF5.2	6403105	Comment / 0

End Node Ref:LatF5.2 | I/L : metres

Metro Rod (Oxon & West Bucks)
Unit 6, Pear Tree Farm Industrial Estate
Bicester Road
Marsh Gibbon
Oxon
Oxfordshire
OX27 0GB

CCTV Inspection Photos

Job Number	Surveyed by (Operator)	Base Unit	Date
397144	**Mark Brownlee**	**LDEH3V4RP4**	**20/05/2022**

F5 Location

F5 Internal

CCTV Inspection Report

Metro Rod (Oxon & West Bucks)
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Surveyed by (Operator)	Job Number	Pipe Length Reference(PLR)	Date	Pre Cleaned
Mark Brownlee	**397144**	**F5 X**	**20/05/2022**	**Not Cleaned**
Weather	Customer Present	Service Grade/Structural Grade	Base Unit	Section Number
1 - Dry		**0/1**	**LDEH3V4RP4**	**24**

Road **EP Barrus**
Place **Glen Way**
Location **Launton Road**

Ground Surface **Gravel**
Code List **Drain and Sewer Codes (5th Edition)**
Location Details

Shape/Size **100mm**
Material **Vitrified clay**
Duty **Foul**

Start MH **F5**
End MH **F6**
Total length **28.76 metres**

Scale **1:1.51**
Direction **Downstream**

Start Node Ref:F5 | I/L :0.700 metres | Depth: 0.700 metres

Position	Code	Description	Photo	Type/Grade
0.00	MH	Start node type, manhole, reference F5	6403109	Comment / 0
0.00	WL	Water level 0% height/diameter	6403110	Comment / 0
0.42	WLT (S01)	Turbid water level 5% height/diameter, Start	6403113	Comment / 0
2.62	WLT (F01)	Turbid water level 5% height/diameter, Finished	6403114	Comment / 0
5.87	JDM	Joint displaced medium	6403122	Structural / 1
9.47	JDM	Joint displaced medium	6403134	Structural / 1
21.29	JDM	Joint displaced medium	6403135	Structural / 1
26.71	WLC (S02)	Clear water level 5% height/diameter - Remark: Sewage Stalled in pipe , Start	6403142	Comment / 0
28.76	WLC (F02)	Clear water level 5% height/diameter - Remark: Sewage Stalled in pipe , Finished	6403144	Comment / 0
28.76	MHF	Finish node type, manhole, reference F6	6403145	Comment / 0

End Node Ref:F6 | I/L :0.940 metres | Depth: 0.940 metres

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Job Number	Surveyed by (Operator)	Base Unit	Date
397144	**Mark Brownlee**	**LDEH3V4RP4**	**20/05/2022**

F5 Location

F5 Internal

F6 Internal

F6 Location

CCTV Inspection Report

Metro Rod (Oxon & West Bucks)
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Surveyed by (Operator)	Job Number	Pipe Length Reference(PLR)	Date	Pre Cleaned
Mark Brownlee	**397144**	**F6 X**	**20/05/2022**	**Not Cleaned**
Weather	Customer Present	Service Grade/Structural Grade	Base Unit	Section Number
1 - Dry		**0/1**	**LDEH3V4RP4**	**25**

Road **EP Barrus**
Place **Glen Way**
Location **Launton Road**

Ground Surface **Gravel**
Code List **Drain and Sewer Codes (5th Edition)**
Location Details

Shape/Size **100mm**
Material **Vitrified clay**
Duty **Foul**

Start MH **F6**
End MH **F7**
Total length **32.8 metres**

Scale **1:1.72**
Direction **Downstream**

Start Node Ref:F6 | I/L :0.940 metres | Depth: 0.940 metres

Position	Code	Description	Photo	Type/Grade
0.00	MH	Start node type, manhole, reference F6	6403245	Comment / 0
0.00	WL	Water level 0% height/diameter	6403246	Comment / 0
4.25	JDM	Joint displaced medium	6403247	Structural / 1
6.54	JDM	Joint displaced medium	6403250	Structural / 1
13.59	OJM	Open joint medium	6403260	Structural / 1
17.11	OJM	Open joint medium	6403261	Structural / 1
32.80	MHF	Finish node type, manhole, reference F7	6403288	Comment / 0

End Node Ref:F7 | I/L :1.650 metres | Depth: 1.650 metres

CCTV Inspection Photos

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Job Number	Surveyed by (Operator)	Base Unit	Date
397144	**Mark Brownlee**	**LDEH3V4RP4**	**20/05/2022**

F6 Location

F6 Internal

F7 Internal

CCTV Inspection Report

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Surveyed by (Operator)	Job Number	Pipe Length Reference(PLR)	Date	Pre Cleaned
Mark Brownlee	**397144**	**F2 X**	**20/05/2022**	**Not Cleaned**
Weather	Customer Present	Service Grade/Structural Grade	Base Unit	Section Number
1 - Dry		**2/0**	**LDEH3V4RP4**	**26**

Road **EP Barrus**
Place **Glen Way**
Location **Launton Road**

Ground Surface **Concrete**
Code List **Drain and Sewer Codes (5th Edition)**
Location Details

Shape/Size **150mm**
Material **Vitrified clay**
Duty **Foul**

Start MH **F7**
End MH **F2**
Total length **45 metres**

Scale **1:2.36**
Direction **Upstream**

Start Node Ref:F7 | I/L :1.650 metres | Depth: 1.650 metres

Position	Code	Description	Photo	Type/Grade
0.00	MH	Start node type, manhole, reference F7	6403454	Comment / 0
0.00	WL	Water level 5% height/diameter	6403455	Comment / 0
0.12	LL	Line of drain/sewer deviates left	6403456	Comment / 0
1.91	DEZ (S01)	Other attached deposits from 7 to 5 o'clock 5% cross-sectional area loss - Remark Scale, Start	6403459	Service / 2
3.69	WLC (S02)	Clear water level 10% height/diameter, Start	6403466	Comment / 0
10.83	WLC (F02)	Clear water level 10% height/diameter, Finished	6403500	Comment / 0
10.83	WLC (S03)	Clear water level 5% height/diameter, Start	6403504	Comment / 0
25.90	WLT (S04)	Turbid water level 25% height/diameter, Start	6403517	Comment / 0
32.11	FW	Flow from incoming pipe, at 3 o'clock 10% of the vertical dimension	6403523	Comment / 0
32.13	WLT (F04)	Turbid water level 25% height/diameter, Finished	6403524	Comment / 0
32.16	JN	Junction at 3 o'clock, diameter 150mm	6403526	Comment / 0
33.22	WLC (F03)	Clear water level 5% height/diameter, Finished	6403527	Comment / 0
33.22	WLC (S05)	Clear water level 10% height/diameter, Start	6403528	Comment / 0
36.62	REM	High flow rate through pipework	6403531	Comment / 0
37.38	DEZ (F01)	Other attached deposits from 7 to 5 o'clock 5% cross-sectional area loss - Remark Scale, Finished	6403537	Service / 2
37.40	WLC (F05)	Clear water level 10% height/diameter, Finished	6403532	Comment / 0
37.40	WLT (S06)	Turbid water level 25% height/diameter, Start	6403538	Comment / 0
38.19	WLT (F06)	Turbid water level 25% height/diameter, Finished	6403540	Comment / 0
38.19	SA	Survey abandoned - Remark: Out Of Reel. Have Surveyed downstream from F2 as well	6403542	Comment / 0

End Node Ref:F2 | I/L :0.800 metres | Depth: 0.800 metres

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CCTV Inspection Photos

Job Number	Surveyed by (Operator)	Base Unit	Date
397144	**Mark Brownlee**	**LDEH3V4RP4**	**20/05/2022**

F7 Internal

Other attached deposits from 7 to 5 o'clock 5% cross-sectional area loss - Remark Scale, Start

High flow rate through pipework

Other attached deposits from 7 to 5 o'clock 5% cross-sectional area loss - Remark Scale, Finished

Survey abandoned - Remark: Out Of Reel. Have Surveyed downstream from F2 as well

CCTV Inspection Report

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Surveyed by (Operator)	Job Number	Pipe Length Reference(PLR)	Date	Pre Cleaned
Mark Brownlee	**397144**	**F7 X**	**20/05/2022**	**Not Cleaned**
Weather	Customer Present	Service Grade/Structural Grade	Base Unit	Section Number
1 - Dry		**0/1**	**LDEH3V4RP4**	**27**

Road **EP Barrus**
Place **Glen Way**
Location **Launton Road**

Ground Surface **Concrete**
Code List **Drain and Sewer Codes (5th Edition)**
Location Details

Shape/Size **150mm**
Material **Vitrified clay**
Duty **Foul**

Start MH **F7**
End MH **Main**
Total length **21 metres**

Scale **1:1.10**
Direction **Downstream**

Start Node Ref:F7 | I/L :1.650 metres | Depth: 1.650 metres

Position	Code	Description	Photo	Type/Grade
0.00	MH	Start node type, manhole, reference F7	6403561	Comment / 0
0.00	WL	Water level 10% height/diameter	6403562	Comment / 0
2.93	REM	High rate of flow from upstream	6403569	Comment / 0
7.23	JDM	Joint displaced medium	6403576	Structural / 1
9.31	MCCI	Material of drain/sewer changes to cast iron at this point	6403581	Comment / 0
11.27	MCVC	Material of drain/sewer changes to vitrified clay at this point	6404923	Comment / 0
16.28	JN	Junction at 10 o'clock, diameter 150mm	6403602	Comment / 0
17.34	WLT (S01)	Turbid water level 25% height/diameter, Start	6403633	Comment / 0
19.17	WLT (F01)	Turbid water level 25% height/diameter, Finished	6403641	Comment / 0
19.17	SA	Survey abandoned - Remark: Loss of Vision	6403644	Comment / 0

End Node Ref:Main | I/L : metres

CCTV Inspection Photos

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Job Number	Surveyed by (Operator)	Base Unit	Date
397144	**Mark Brownlee**	**LDEH3V4RP4**	**20/05/2022**

F7 Internal

High rate of flow from upstream

Survey abandoned - Remark: Loss of Vision

Project

Project Name: 397144

Project Date: 24/05/2022

Inspection Standard: MSCC5 Sewers & Drainage GB (SRM5 Scoring)

Metro Rod
Unit 6 Peartree Farm Ind Est, Bicester Road, Marsh Gibbon

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Project Name	Project Number	Project Date
397144		24/05/2022

Metro Rod
Unit 6 Peartree Farm Ind Est, Bicester Road, Marsh Gibbon

Project Information

Project Name	Project Number	Project Date
397144		24/05/2022

Client

Company: CSG
Street: C/O Further recommendations

Site

Company: EP Barrus

Contractor

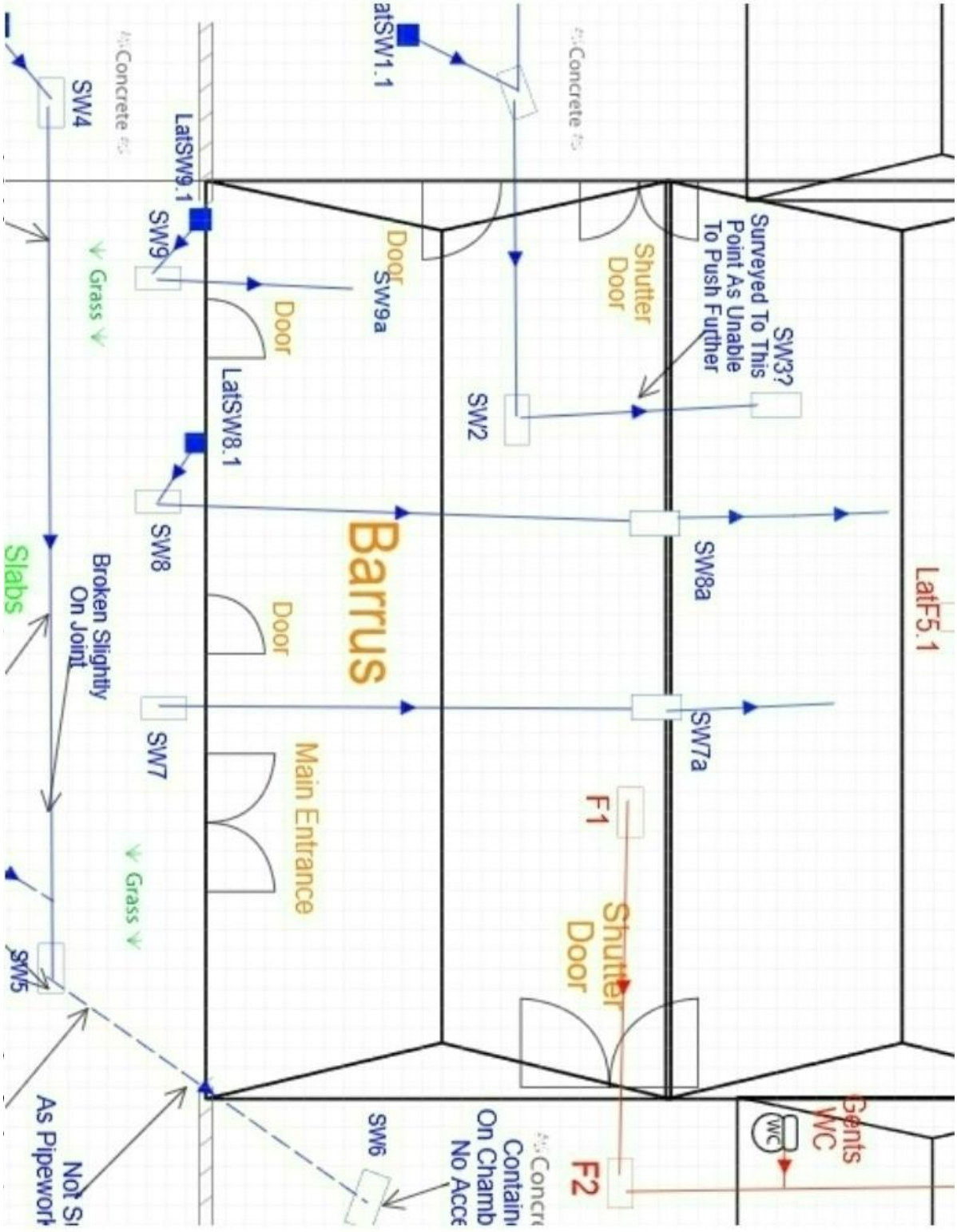
Company: Metro Rod
Street: Unit 6 Peartree Farm Ind Est, Bicester Road
Town or City: Marsh Gibbon
County: Oxon

Metro Rod
Unit 6 Peartree Farm Ind Est, Bicester Road, Marsh Gibbon

Project Information

Project Name	Project Number	Project Date
397144		24/05/2022

Project Drawing



Metro Rod
Unit 6 Peartree Farm Ind Est, Bicester Road, Marsh Gibbon

Scoring Summary

Project Name	Project Number	Project Date
397144		24/05/2022

Structural Defects

Section	PLR	Grade	Description
All inspected pipes are in an acceptable structural condition (< grade 3).			

Service / Operational Condition

Grade 3: Best practice suggests consideration should be given to maintenance activities in the medium term.

Grade 4: Best practice suggests consideration should be given to maintenance activity to avoid potential blockages.

Grade 5: Best practice suggests that this pipe is at a high risk of backing up or causing flooding.

Section	PLR	Grade	Description
1	SW9X	3	Settled deposits, fine, 10% cross-sectional area loss, finish
3	SW8X	5	Other obstacles from 4 o'clock to 5 o'clock, 5% cross-sectional area loss
5	SW7X	3	Settled deposits, fine, 10% cross-sectional area loss, finish

Abandoned Surveys

Section	PLR	Description
2	SW9aX	Survey abandoned
4	SW8aX	Survey abandoned
6	SW7aX	Survey abandoned

Information

These scoring summaries are based on the SRM grading from the WRc.

Metro Rod
Unit 6 Peartree Farm Ind Est, Bicester Road, Marsh Gibbon

Section Inspection - 24/05/2022 - SW9X

Section	Inspection	Date	Time	Client`s Job Ref	Weather	Pre Cleaned	PLR
1	1	24/05/22	15:30	Not Specified	Not Specified	Not Specified	SW9X

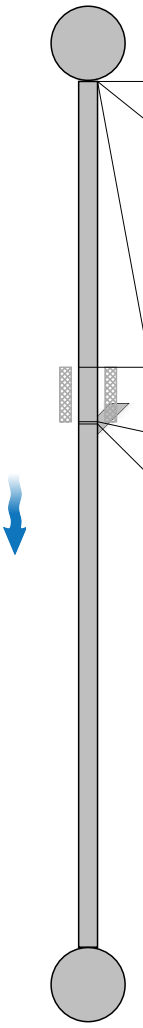
Operator	Vehicle	Camera	Preset Length	Legal Status	Alternative ID
Not Specified	Not Specified	Not Specified	Not Specified	Not Specified	Not Specified

Town or Village:	Bicester	**Inspection Direction:**	Downstream	**Upstream Node:**	SW9
Road:	Glen Way	**Inspected Length:**	19.82 m	**Upstream Pipe Depth:**	
Location:		**Total Length:**	19.82 m	**Downstream Node:**	SW9A
Surface Type:		**Joint Length:**	0.00 m	**Downstream Pipe Depth:**	

Use:	Surface water	**Pipe Shape:**	Circular
Type of Pipe:		**Dia/Height:**	150 mm
Year Constructed:		**Material:**	Vitrified clay
Flow Control:		**Lining Type:**	No Lining
Inspection Purpose:		**Lining Material:**	No Lining

Comments:
Recommendations:

Scale: 1:173



Position [m]		Code	Observation	Grade
0.00		MH	Start node type, manhole, reference number: SW9	
0.00		WL	Water level, 0% of the vertical dimension	
6.54	S01	DES	Settled deposits, fine, 10% cross-sectional area loss, start	
7.80	F01	DES	Settled deposits, fine, 10% cross-sectional area loss, finish	3
7.84		JN	Junction at 9 o'clock, diameter: 150mm	
0.00		MHF	Finish node type, manhole, reference number: SW9a	


WL @ 0.00 m


DES @ 6.54 m


JN @ 7.84 m

Construction Features					Miscellaneous Features				
Structural Defects					Service & Operational Observations				
STR No. Def	**STR Peak**	**STR Mean**	**STR Total**	**STR Grade**	**SER No. Def**	**SER Peak**	**SER Mean**	**SER Total**	**SER Grade**
0	0.0	0.0	0.0	1.0	1	2.0	0.5	4.0	3.0

Metro Rod
Unit 6 Peartree Farm Ind Est, Bicester Road, Marsh Gibbon

Section Pictures - 24/05/2022 - SW9X

Section	Inspection Direction	PLR	Client`s Job Ref	Contractor`s Job Ref
1	Downstream	SW9X		397144

SW9X_79c40ef2-a3d6-493b-bca6-40237014a7b9_20220524_153302_791.jpg, 00:00:06, 0.00 m
Water level, 0% of the vertical dimension

SW9X_bf174e5f-7231-42d9-a190-5e3acabe447a_20220524_153346_311.jpg, 00:00:32, 6.54 m
Settled deposits, fine, 10% cross-sectional area loss, start

SW9X_09760fb7-84e8-4291-9d2e-5da4e6c0aa3f_20220524_153419_676.jpg, 00:00:39, 7.84 m
Junction at 9 o'clock, diameter: 150mm

Metro Rod
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Section Inspection - 24/05/2022 - SW9aX

Section	Inspection	Date	Time	Client`s Job Ref	Weather	Pre Cleaned	PLR
2	2	24/05/22	15:35	Not Specified	Not Specified	Not Specified	SW9AX

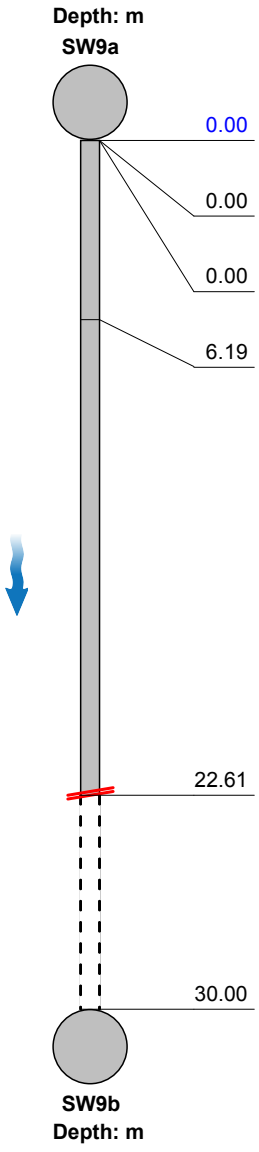
Operator	Vehicle	Camera	Preset Length	Legal Status	Alternative ID
Not Specified	Not Specified	Not Specified	Not Specified	Not Specified	Not Specified

Town or Village:	Bicester	**Inspection Direction:**	Downstream	**Upstream Node:**	SW9A
Road:	Glen Way	**Inspected Length:**	22.61 m	**Upstream Pipe Depth:**	
Location:		**Total Length:**	30.00 m	**Downstream Node:**	SW9B
Surface Type:		**Joint Length:**	0.00 m	**Downstream Pipe Depth:**	

Use:	Surface water	**Pipe Shape:**	Circular
Type of Pipe:		**Dia/Height:**	150 mm
Year Constructed:		**Material:**	Vitrified clay
Flow Control:		**Lining Type:**	No Lining
Inspection Purpose:		**Lining Material:**	No Lining

Comments:
Recommendations:

Scale: 1:261



Position [m]	Code	Observation	Grade
0.00	MH	Start node type, manhole, reference number: SW9a: internal	
0.00	WL	Water level, 0% of the vertical dimension	
0.00	REM	General remark: continued through internal from previous section	
6.19	CUZ	Loss of vision, other: obscured by cobwebs	
22.61	SA	Survey abandoned: total loss vision cobwebs	
30.00		End of pipe	

WL @ 0.00 m


CUZ @ 6.19 m

Construction Features					Miscellaneous Features				
Structural Defects					Service & Operational Observations				
STR No. Def	**STR Peak**	**STR Mean**	**STR Total**	**STR Grade**	**SER No. Def**	**SER Peak**	**SER Mean**	**SER Total**	**SER Grade**
0	0.0	0.0	0.0	1.0	0	0.0	0.0	0.0	1.0

Section Pictures - 24/05/2022 - SW9aX

Section	Inspection Direction	PLR	Client`s Job Ref	Contractor`s Job Ref
2	Downstream	SW9AX		397144

SW9aX_cf56c817-98f9-4476-8650-8f2cfa978095_20220524_153723_894.jpg, 00:00:12, 0.00 m
Water level, 0% of the vertical dimension

SW9aX_25ac594d-fd63-472f-92d9-7faca6f72f29_20220524_153818_334.jpg, 00:00:41, 6.19 m
Loss of vision, other, obscured by cobwebs

Metro Rod
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Section Inspection - 24/05/2022 - SW8X

Section	Inspection	Date	Time	Client`s Job Ref	Weather	Pre Cleaned	PLR
3	3	24/05/22	15:40	Not Specified	Not Specified	Not Specified	SW8X

Operator	Vehicle	Camera	Preset Length	Legal Status	Alternative ID
Not Specified	Not Specified	Not Specified	Not Specified	Not Specified	Not Specified

Town or Village:	Bicester	**Inspection Direction:**	Downstream	**Upstream Node:**	SW8
Road:	Glen Way	**Inspected Length:**	33.62 m	**Upstream Pipe Depth:**	0.600 m
Location:		**Total Length:**	33.62 m	**Downstream Node:**	SW8A
Surface Type:		**Joint Length:**	0.00 m	**Downstream Pipe Depth:**	

Use:	Surface water	**Pipe Shape:**	Circular
Type of Pipe:		**Dia/Height:**	150 mm
Year Constructed:		**Material:**	Vitrified clay
Flow Control:		**Lining Type:**	No Lining
Inspection Purpose:		**Lining Material:**	No Lining

Comments:
Recommendations:

Scale: 1:293

Position [m]		Code	Observation	Grade
0.00		MH	Start node type, manhole, reference number: SW8	
0.00		WL	Water level, 0% of the vertical dimension	
0.51	S01	DES	Settled deposits, fine, 10% cross-sectional area loss, start	
7.60	F01	DES	Settled deposits, fine, 10% cross-sectional area loss, finish	3
7.60		WL	Water level, 15% of the vertical dimension	
8.32		JDM	Joint displaced, medium	1 / 3
8.57		JN	Junction at 10 o'clock, diameter: 150mm	
10.36		REM	General remark: frothy water?	
25.17		OBZ	Other obstacles from 4 o'clock to 5 o'clock, 5% cross-sectional area loss	5
33.62		MHF	Finish node type, manhole, reference number: SW8a: internal	


WL @ 0.00 m


DES @ 0.51 m


WL @ 7.60 m


JDM @ 8.32 m


JN @ 8.57 m

Metro Rod
Unit 6 Peartree Farm Ind Est, Bicester Road, Marsh Gibbon

Section Inspection - 24/05/2022 - SW8X

Section	Inspection	Date	Time	Client`s Job Ref	Weather	Pre Cleaned	PLR
3	3	24/05/22	15:40	Not Specified	Not Specified	Not Specified	SW8X

Operator	Vehicle	Camera	Preset Length	Legal Status	Alternative ID
Not Specified	Not Specified	Not Specified	Not Specified	Not Specified	Not Specified

REM @ 10.36 m

OBZ @ 25.17 m

MHF @ 33.62 m

Construction Features					Miscellaneous Features				
Structural Defects					Service & Operational Observations				
STR No. Def	STR Peak	STR Mean	STR Total	STR Grade	SER No. Def	SER Peak	SER Mean	SER Total	SER Grade
1	1.0	0.0	1.0	1.0	3	10.0	1.1	28.0	5.0

Section Pictures - 24/05/2022 - SW8X

Section	Inspection Direction	PLR	Client`s Job Ref	Contractor`s Job Ref
3	Downstream	SW8X		397144

SW8X_81c4a750-b065-4289-945d-60944e585702_20220524_154207_644.jpg, 00:00:09, 0.00 m
Water level, 0% of the vertical dimension

SW8X_4007ea33-9ca3-47e4-84b9-524f0be99d4e_20220524_154241_227.jpg, 00:00:15, 0.51 m
Settled deposits, fine, 10% cross-sectional area loss, start

SW8X_342466c4-9ade-445f-b00d-9a2e7e0cc48a_20220524_154336_648.jpg, 00:00:33, 7.60 m
Water level, 15% of the vertical dimension

SW8X_e9f3c9bc-7f79-452e-9013-7e3c0039f48b_20220524_154353_069.jpg, 00:00:36, 8.32 m
Joint displaced, medium

Section Pictures - 24/05/2022 - SW8X

Section	Inspection Direction	PLR	Client`s Job Ref	Contractor`s Job Ref
3	Downstream	SW8X		397144

SW8X_4f221960-a994-46da-b7d0-640ef9967412_20220524_154449_738.jpg, 00:00:27, 8.57 m
Junction at 10 o'clock, diameter: 150mm

SW8X_454c33e9-644a-4d73-b1cc-f96f7c16f1d4_20220524_154643_591.jpg, 00:00:45, 10.36 m
General remark, frothy water?

SW8X_4b8631f0-a9bb-4ee2-b759-69b4075cb24a_20220524_154757_309.jpg, 00:01:33, 25.17 m
Other obstacles from 4 o'clock to 5 o'clock, 5% cross-sectional area loss

SW8X_21172983-4912-4885-a99f-58da5612fb49_20220524_154854_773.jpg, 00:02:09, 33.62 m
Finish node type, manhole, reference number: SW8a, internal

Metro Rod
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Section Inspection - 24/05/2022 - SW8aX

Section	Inspection	Date	Time	Client`s Job Ref	Weather	Pre Cleaned	PLR
4	4	24/05/22	15:49	Not Specified	Not Specified	Not Specified	SW8AX

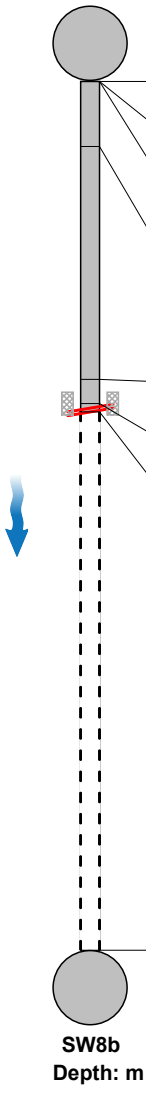
Operator	Vehicle	Camera	Preset Length	Legal Status	Alternative ID
Not Specified	Not Specified	Not Specified	Not Specified	Not Specified	Not Specified

Town or Village:	Bicester	**Inspection Direction:**	Downstream	**Upstream Node:**	SW8A
Road:	Glen Way	**Inspected Length:**	11.43 m	**Upstream Pipe Depth:**	
Location:		**Total Length:**	30.00 m	**Downstream Node:**	SW8B
Surface Type:		**Joint Length:**	0.00 m	**Downstream Pipe Depth:**	

Use:	Surface water	**Pipe Shape:**	Circular
Type of Pipe:		**Dia/Height:**	150 mm
Year Constructed:		**Material:**	Vitrified clay
Flow Control:		**Lining Type:**	No Lining
Inspection Purpose:		**Lining Material:**	No Lining

Comments:
Recommendations:

Scale: 1:261



Position [m]		Code	Observation	Grade
0.00		MH	Start node type, manhole, reference number: SW8a	
0.00		WL	Water level, 0% of the vertical dimension	
0.00		REM	General remark: continued from previous section	
2.26		WL	Water level, 10% of the vertical dimension: froth on water?	
10.29		WL	Water level, 20% of the vertical dimension	
11.13	S01	DEC	Settled deposits, hard or compacted, 20% cross-sectional area loss, start	4
11.43		SA	Survey abandoned: unable to proceed	
30.00			End of pipe	

WL @ 0.00 m


WL @ 2.26 m


WL @ 10.29 m


DEC @ 11.13 m

Construction Features					Miscellaneous Features				
Structural Defects					Service & Operational Observations				
STR No. Def	**STR Peak**	**STR Mean**	**STR Total**	**STR Grade**	**SER No. Def**	**SER Peak**	**SER Mean**	**SER Total**	**SER Grade**
0	0.0	0.0	0.0	1.0	1	0.0	0.4	5.0	1.0

Section Pictures - 24/05/2022 - SW8aX

Section	Inspection Direction	PLR	Client`s Job Ref	Contractor`s Job Ref
4	Downstream	SW8AX		397144

SW8aX_9c9affd4-1f05-4521-9a94-433279210b02_20220524_155018_938.jpg, 00:00:09, 0.00 m
Water level, 0% of the vertical dimension

SW8aX_af97abca-b69c-4581-80f3-69327043c02c_20220524_155111_170.jpg, 00:00:19, 2.26 m
Water level, 10% of the vertical dimension, froth on water?

SW8aX_352249c9-9cd5-4453-90f9-7abbf84f1f99_20220524_155158_605.jpg, 00:00:51, 10.29 m
Water level, 20% of the vertical dimension

SW8aX_17b95e9e-220e-4be2-a1a7-3f4044087fcb_20220524_155231_647.jpg, 00:00:55, 11.13 m
Settled deposits, hard or compacted, 20% cross-sectional area loss, start

Metro Rod
Unit 6 Peartree Farm Ind Est, Bicester Road, Marsh Gibbon

Section Inspection - 24/05/2022 - SW7X

Section	Inspection	Date	Time	Client`s Job Ref	Weather	Pre Cleaned	PLR
5	5	24/05/22	15:53	Not Specified	Not Specified	Not Specified	SW7X

Operator	Vehicle	Camera	Preset Length	Legal Status	Alternative ID
Not Specified	Not Specified	Not Specified	Not Specified	Not Specified	Not Specified

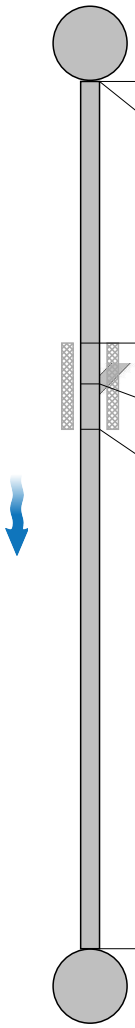
Town or Village:	Bicester	**Inspection Direction:**	Downstream	**Upstream Node:**	SW7
Road:	Glen Way	**Inspected Length:**	34.65 m	**Upstream Pipe Depth:**	0.600 m
Location:		**Total Length:**	34.65 m	**Downstream Node:**	SW7A
Surface Type:		**Joint Length:**	0.00 m	**Downstream Pipe Depth:**	

Use:	Surface water	**Pipe Shape:**	Circular
Type of Pipe:		**Dia/Height:**	150 mm
Year Constructed:		**Material:**	Vitrified clay
Flow Control:		**Lining Type:**	No Lining
Inspection Purpose:		**Lining Material:**	No Lining

Comments:
Recommendations:

Scale: 1:302

Depth: 0.60 m
SW7



SW7a
Depth: m

Position [m]		Code	Observation	Grade
0.00		MH	Start node type, manhole, reference number: SW7	
0.00		WL	Water level, 0% of the vertical dimension	
10.47	S01	DES	Settled deposits, fine, 10% cross-sectional area loss, start	
12.08		JN	Junction at 9 o'clock, diameter: 100mm	
13.92	F01	DES	Settled deposits, fine, 10% cross-sectional area loss, finish	3
34.65		MHF	Finish node type, manhole, reference number: SW7a: internal	

WL @ 0.00 m

DES @ 10.47 m

JN @ 12.08 m

MHF @ 34.65 m

Construction Features					Miscellaneous Features				
Structural Defects					Service & Operational Observations				
STR No. Def	**STR Peak**	**STR Mean**	**STR Total**	**STR Grade**	**SER No. Def**	**SER Peak**	**SER Mean**	**SER Total**	**SER Grade**
0	0.0	0.0	0.0	1.0	1	2.0	0.6	8.0	3.0

Section Pictures - 24/05/2022 - SW7X

Section	Inspection Direction	PLR	Client`s Job Ref	Contractor`s Job Ref
5	Downstream	SW7X		397144

SW7X_f3e454aa-2c3b-4ec5-93fb-6450f1ce7357_20220524_155500_857.jpg, 00:00:13, 0.00 m
Water level, 0% of the vertical dimension

SW7X_dc245387-ccb8-4121-b59f-93122fa6a0b2_20220524_155543_172.jpg, 00:00:36, 10.47 m
Settled deposits, fine, 10% cross-sectional area loss, start

SW7X_dc5a9c8d-b0b0-4b9f-9e3a-5ba773705f6a_20220524_155603_277.jpg, 00:00:41, 12.08 m
Junction at 9 o'clock, diameter: 100mm

SW7X_8d4e9691-90da-42e4-aa06-2722d46ca9f2_20220524_155733_967.jpg, 00:01:35, 34.65 m
Finish node type, manhole, reference number: SW7a, internal

Metro Rod
Unit 6 Peartree Farm Ind Est, Bicester Road, Marsh Gibbon

Section Inspection - 24/05/2022 - SW7aX

Section	Inspection	Date	Time	Client`s Job Ref	Weather	Pre Cleaned	PLR
6	6	24/05/22	15:57	Not Specified	Not Specified	Not Specified	SW7AX

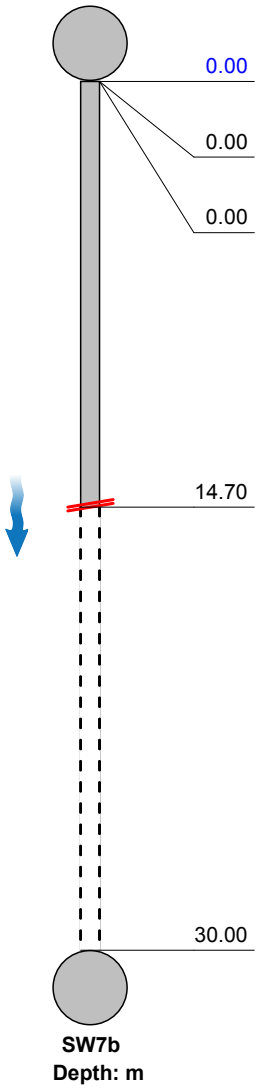
Operator	Vehicle	Camera	Preset Length	Legal Status	Alternative ID
Not Specified	Not Specified	Not Specified	Not Specified	Not Specified	Not Specified

Town or Village:	Bicester	**Inspection Direction:**	Downstream	**Upstream Node:**	SW7A
Road:	Glen Way	**Inspected Length:**	14.70 m	**Upstream Pipe Depth:**	
Location:		**Total Length:**	30.00 m	**Downstream Node:**	SW7B
Surface Type:		**Joint Length:**	0.00 m	**Downstream Pipe Depth:**	

Use:	Surface water	**Pipe Shape:**	Circular
Type of Pipe:		**Dia/Height:**	225 mm
Year Constructed:		**Material:**	Vitrified clay
Flow Control:		**Lining Type:**	No Lining
Inspection Purpose:		**Lining Material:**	No Lining

Comments:
Recommendations:

Scale: 1:261



Position [m]	Code	Observation	Grade
0.00	MH	Start node type, manhole, reference number: SW7a: internal	
0.00	WL	Water level, 0% of the vertical dimension	
0.00	REM	General remark: continued from previous section	
14.70	SA	Survey abandoned: Out Off Cable	
30.00		End of pipe	

WL @ 0.00 m

SA @ 14.70 m

Construction Features					Miscellaneous Features				
Structural Defects					Service & Operational Observations				
STR No. Def	**STR Peak**	**STR Mean**	**STR Total**	**STR Grade**	**SER No. Def**	**SER Peak**	**SER Mean**	**SER Total**	**SER Grade**
0	0.0	0.0	0.0	1.0	0	0.0	0.0	0.0	1.0

Section Pictures - 24/05/2022 - SW7aX

Section	Inspection Direction	PLR	Client`s Job Ref	Contractor`s Job Ref
6	Downstream	SW7AX		397144

SW7aX_f8e248c1-7179-4abf-b528-9a0e76aa3fa1_20220524_155855_981.jpg, 00:00:11, 0.00 m
Water level, 0% of the vertical dimension

SW7aX_5a3407ad-2d90-450c-9c57-37b4580906bc_20220524_160033_913.jpg, 00:01:01, 14.70 m
Survey abandoned, Out Off Cable

DO NOT SCALE

LEGEND :

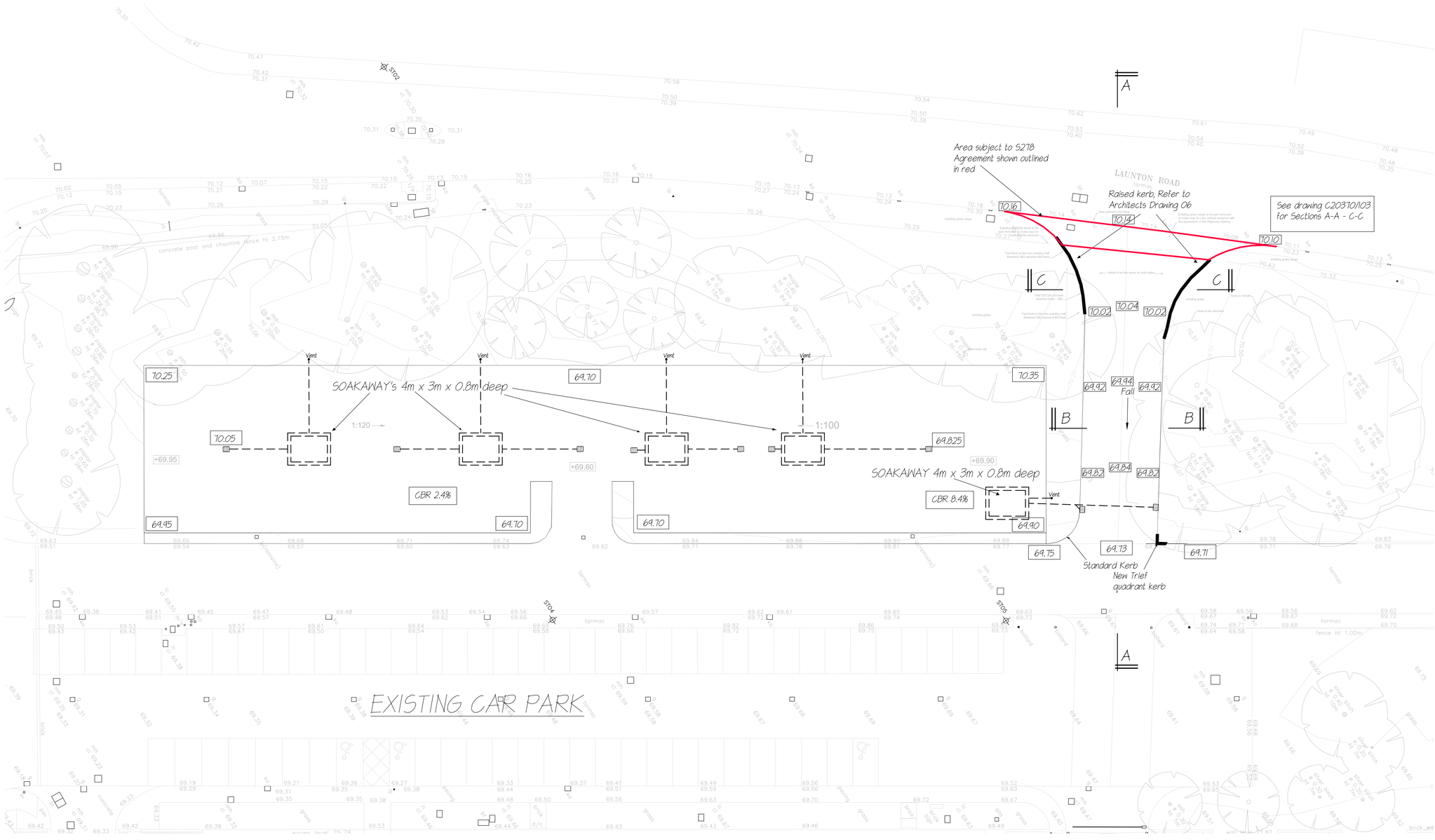
SOAKAWAY

GULLY

DRAINAGE TO SOAKAWAY

NOTES

1. Car Park Surface Construction to be as noted on drawing 102



PRELIMINARY
FOR COMMENTS
NOT TO BE USED FOR CONSTRUCTION

MK	REVISION	DATE
P4	TRIEF KERB ADDED AT JUNCTION	16/7/13
P3	GULLIES ADDED TO NEW ROAD. CAR PARK LEVELS ADDED	15/7/13
P2	SECTION MK's ADDED TO PLAN	9/7/13
P1	ISSUED WORK IN PROGESS	11/6/13

DRAWING TITLE

Drainage for proposed Car Park

CONTRACT

E.P Barrus
Launton Road
Bicester

SIMPSON ASSOCIATES
CONSULTING ENGINEERS LLP
Unit B10
Elmbridge Court Business Park
Gloucester GL3 1JZ
T. 01452-309727 F. 01452-309141
e-mail admin@simpsonassoc.com
ace consultancy engineering business environment
Offices at Henley-on-Thames and Gloucester

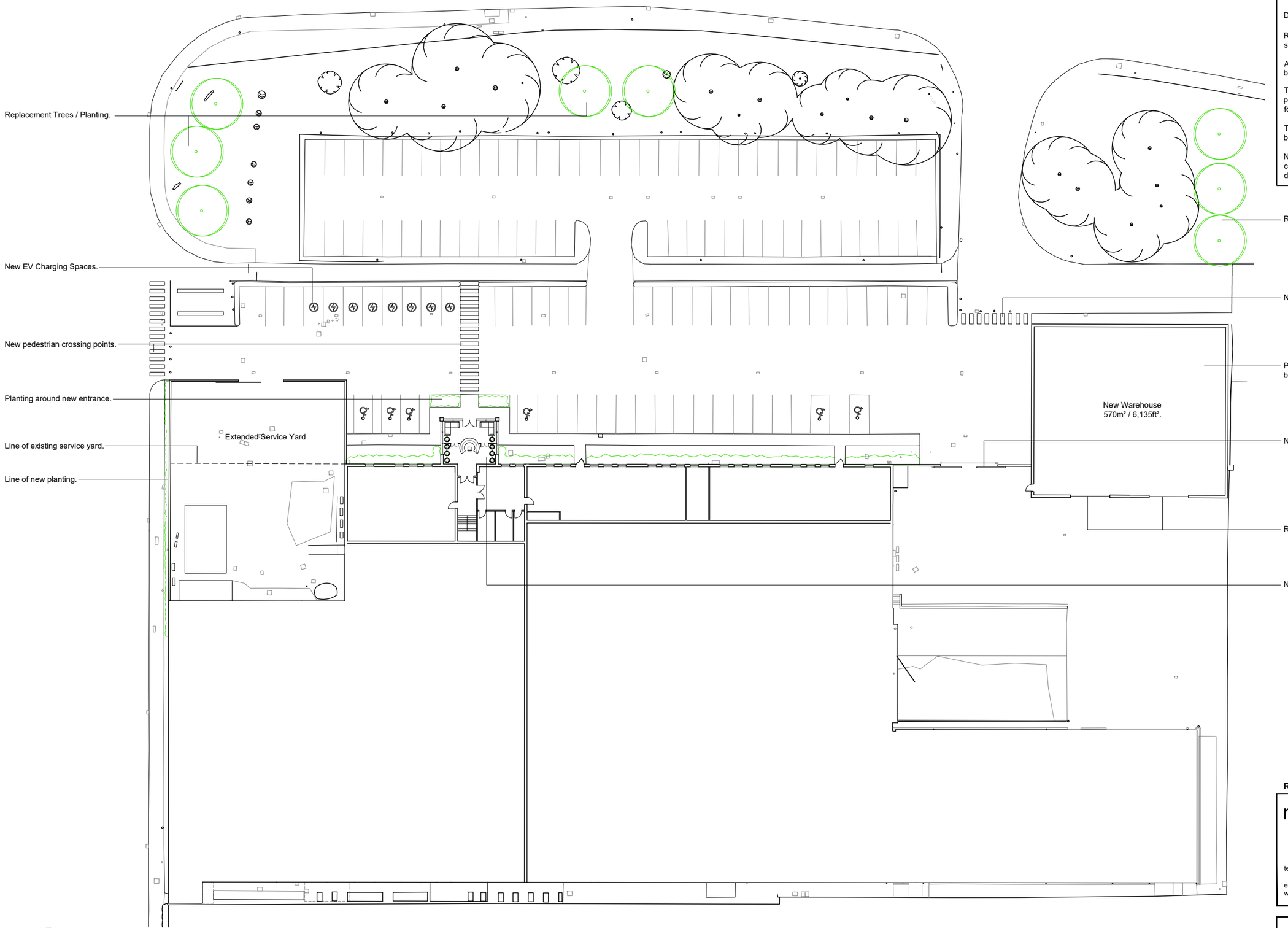
Drawn	Chkd.
EJP	
Scales 1:200@A1	Date JUNE'13

C20712/101 Rev.P4

A1

APPENDIX E

Proposed Development Layout



All dimensions to be checked on site.

Do not scale dimensions from this drawing, use figured dimensions.

Refer to Engineer's drawings and specification for all structural and services information.

Any discrepancies between the Architect's and Engineer's drawings to be reported to the Architect immediately.

The survey information shown on this drawing is based on a survey prepared by a third party and NCA Architects accept no responsibility for the accuracy or completeness of the survey

These drawings have been amended to attain Record drawing status based on information received from the Main Contractor.

Note: Detailed design information for Various components / constructions are indicated on separate specialist sub-contractor drawings, & may supersede the information shown on this drawing.

Rev	Date	Description

nca-**architecture**

tel: 01869 226610

email: enquiries@nca-architecture.co.uk
www.nca-architecture.co.uk

7 Court Farm Barns
Medcroft Road
Tackley, OXON
OX5 3AL

Barrus, Bicester

Site Masterplan

220025 - A - PR - 100

Date: **12.09.2022**
Scale: **1:500@A3**
Status: **Preliminary**
Drawn: **JC**
Revision:

APPENDIX F

Soakaway BRE365 Infiltration Test Report

Our ref: ML/GML23101/S1

Date: 22nd May 2023

BY EMAIL
Robert Muir
E.P Barrus Limited
Glen Way,
Launton Road,
Bicester,
Oxfordshire
OX26 4UR

For the attention of Mr R Muir

Dear Robert,

GML23101: Targeted *In Situ* Infiltration Tests – Site off Launton Road, Bicester.

Recent In Situ Infiltration Rate Testing
As instructed by Armstrong Stokes and Clayton Ltd on behalf of the client we attended the above site to undertake targeted infiltration rate testing, to confirm suitability; or not; for soakaways to be incorporated as part of any proposed drainage design for the proposed future residential redevelopment of the site.

Following discussions with Armstrong Stokes and Clayton Ltd, these tests were targeted to provide a good coverage of the site, with the soakaway test undertaken within the natural strata beneath the topsoil. Exploratory Hole Location Plan (Drawing 001), General Photographic Record (Drawing 002), Exploratory Hole Logs and Soakaway Calculation Sheets are enclosed.

Geo-Matters Ltd have not been made aware of any other previous reports relating to soakaway testing or ground conditions across the site.

This part of the site is recorded to be underlain by Cornbrash (gravelly/cobbly LIMESTONE). The remainder of the site is recorded to be underlain by the Oxford Clay Formation.

1no. soakaway was completed (SA01) to 1.30m below existing ground level (begl), and infiltration rate testing was then undertaken in general accordance with BRE 365. Soil conditions were encountered which comprised a sequence of topsoil to an a depth of 0.175m begl, which was underlain by Cornbrash (LIMESTONE) recovered as a matrix of gravelly sandy slightly silty LIMESTONE matrix.

The soakaway location was filled with water following excavation and was subsequently monitored at regular intervals throughout the day. Within a really short period of time (<30mins) of testing the soakaway test pit had emptied and so tests 2 and 3 were undertaken. All 3no. monitoring tests were completed on Day 1.

The infiltration rates recorded in the recent investigation are shown in Table 1.0 below with the soakaway calculation sheets included at the end of this report:

Table 1.0: Summary of *In Situ* BRE Trial Pit Soakaway Infiltration Rates

Test Point	Highest Recorded Infiltration Rate	Lowest Recorded Infiltration Rate	Notes / Comments
SA01	2.37×10^{-4}	2.02×10^{-4}	Test Passed

Based on the above, it is considered that *in situ* soakaways are a feasible option for this site.

Conclusions
The soakaway tests passed the BRE365 criterion as the test pit discharged fully three times, and therefore it is considered that *in situ* soakaways are a feasible option for this site.

All soakaway designs should be approved by the relevant statutory authority prior to implementation.

Confirmation of ground conditions at the site of the actual soakaway may need to be undertaken if deemed necessary and are proposed in the far east of the site where the Oxford Clay is recorded. There may be other conditions prevailing on site which have not been revealed by this investigation and which have not been taken into account by this report. Responsibility cannot be accepted for any conditions not revealed by this investigation and assessment. It should be noted that groundwater levels and quality may very due to seasonal and other effects.

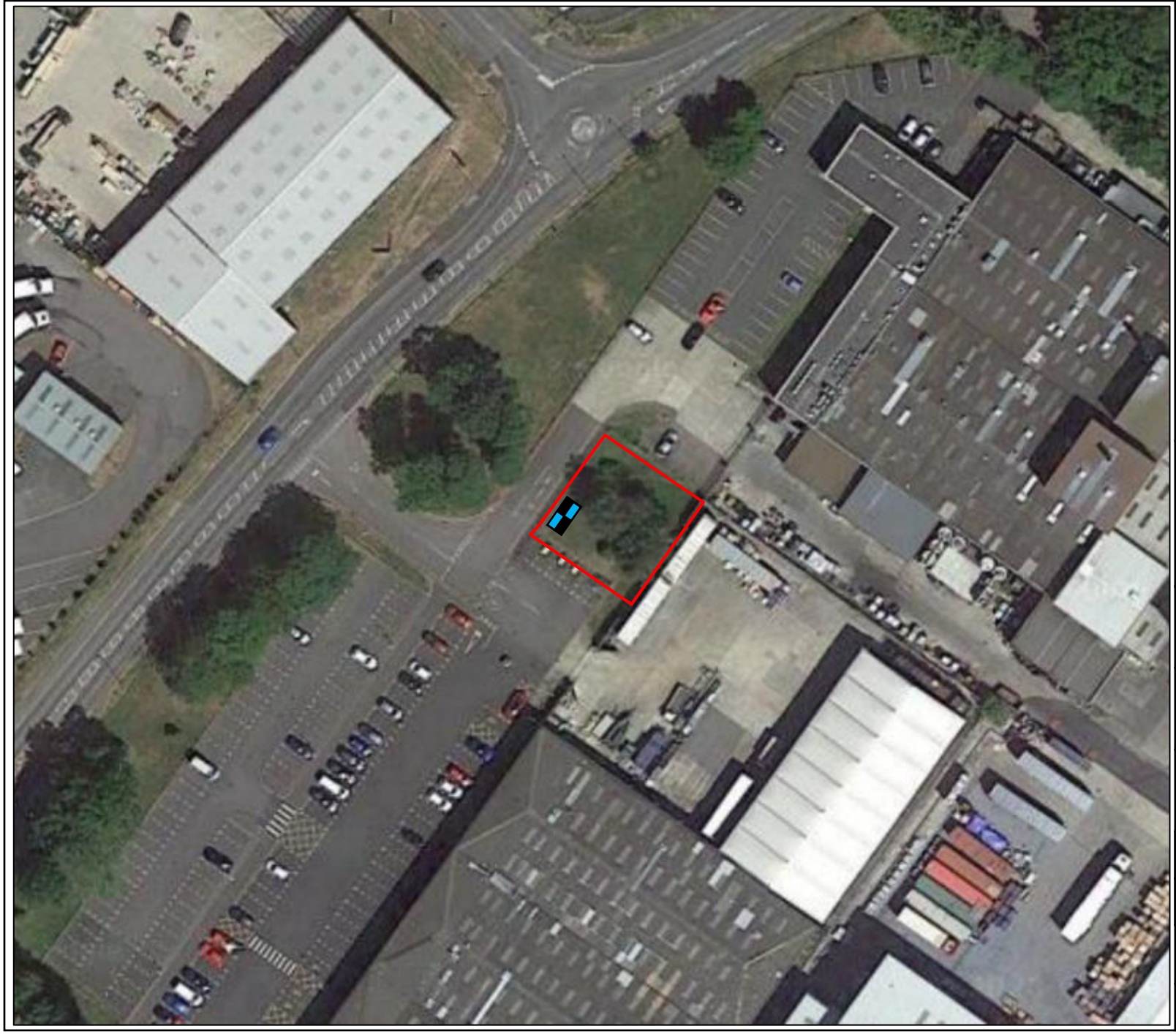
Copies of this letter report should be forwarded to the Local Authority / drainage engineers by the Client should they be required as part of any planning applications, design specifications etc. Should you have any queries or require any further information then please do not hesitate to contact us.

Should you have any queries or require any further information then please do not hesitate to contact us.

Yours faithfully
for Geo-Matters Ltd

Mark Lewis
Geo-Environmental Engineer

Encs. Exploratory Hole Layout Plan (Drawing 001)
General Photographic Record (Drawing 002)
Exploratory Hole Logs
In Situ Permeability Calculation Sheets



DO NOT SCALE

NOTES:

Approx. Location of Soakaway Test Pits

GEOMATTERS consulting engineers

www.geo-matters.com
info@geo-matters.com

CLIENT:

E.P Barrus Limited

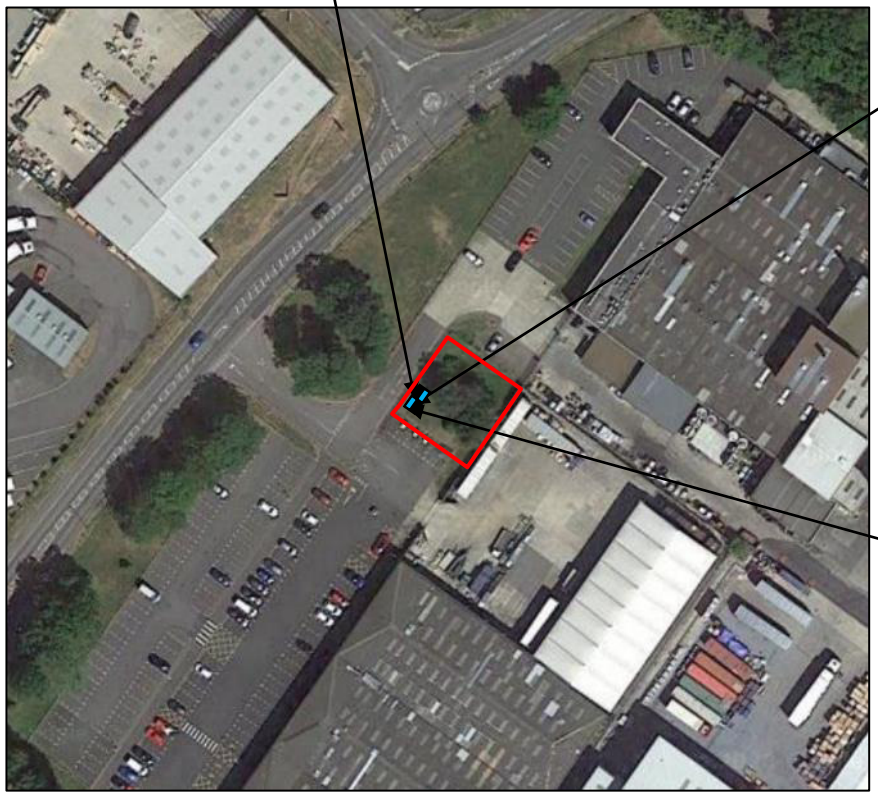
PROJECT:

Launton Road, Bicester

TITLE:

Exploratory Hole Layout Plan

SCALE@SIZE :	ISSUE:
NTS	Final
DESIGN/DRAWN:	DATE:
AMT	May 2023
PROJECT No:	DRAWING No:
GML23101	001



DO NOT SCALE

NOTES:

Approx. Location of Soakaway Test Pits

GEOMATTERS consulting engineers

www.geo-matters.com
info@geo-matters.com

CLIENT:

E.P Barrus Limited

PROJECT:

Launton Road, Bicester

TITLE:

General Photographs Plan

SCALE@SIZE :	ISSUE:
NTS	Final
DESIGN/DRAWN: AMT	DATE: May 2023
PROJECT No: GML23101	DRAWING No: 002

GEOMATTERS consulting engineers	Site: Launton Road, Bicester Client: E.P Barrus Limited	SA01

Contractor: N/A	Project No: GML23101	Sheet: 1 of 1
Equipment: 360 Excavator	Logged by: GML	Date: 17th May 2023

Field Monitoring and Sampling			Strata		Legend
Depth (m)	Type	Result (HSV/PP)	depth (m)	Description	
			0.20	TOPSOIL comprising brown sandy silt	
			1m	Weathered LIMESTONE recovered as an orange gravelly SAND matrix	
			3m	Exploratory location completed at 1.30m depth.	
			4m		
			5m		

Sheet 1 of 1

Groundwater:
No groundwater encountered during excavation.

EXPLORATORY RECORD

Remarks:
1) Trial pit completed as a soakaway test location.
2) Trial pit sides remained stable during excavation.

GEOMATTERS consulting engineers

Strength descriptions of granular soils are based on Engineer's field description(s)

HSV = Hand Shear Vane (kPa), PP = Pocket Penetrometer (daN/cm^2)

SOIL INFILTRATION RATE CALCULATIONS

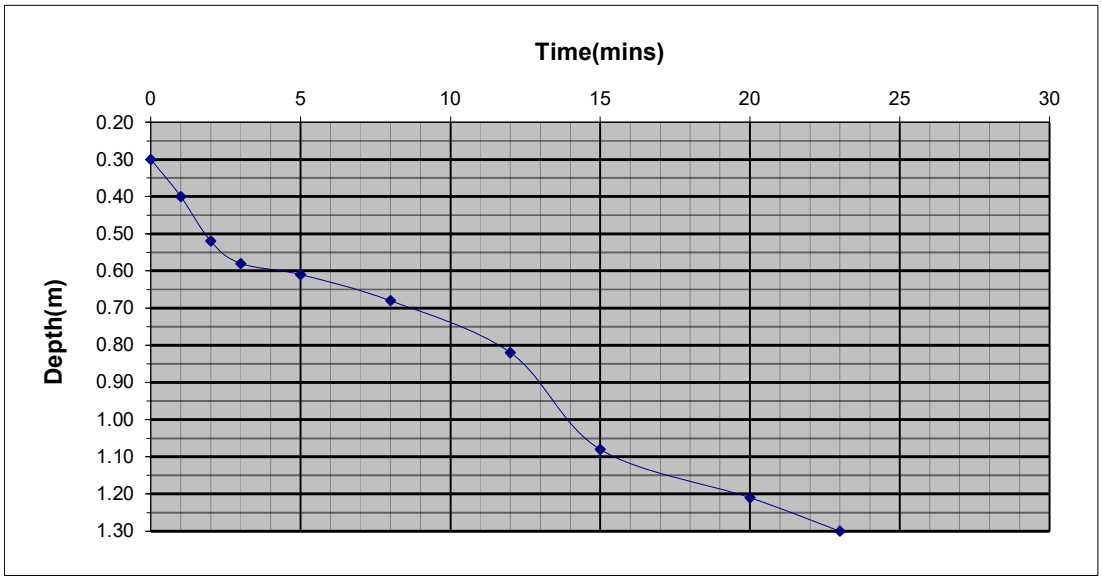
SA01a **Soakaway Test 1**

Time(mins)	Depth(m)
0	0.300
1	0.400
2	0.520
3	0.580
5	0.610
8	0.680
12	0.820
15	1.080
20	1.210
23	1.300

Client :	E P Barrus Limited
Site :	Launton Road, Bicester
Site ref :	GML23101

Trial pit dimensions			
Width(m)	Length(m)	Depth(m)	Gravel (Yes / No)
0.60	1.30	1.30	No

Depth from water level at start of test to bottom of pit =	1.00



75% effective depth(m)	=	0.5500	Time at 75% effective depth(mins)	=	3
25% effective depth(m)	=	1.0500	Time at 25% effective depth(mins)	=	15

Volume outflowing, V_{p75-25} =	0.39
Area, a_{p50} =	2.68
Time, T_{75-25} =	12.0
Infiltration Rate, F =	2.02E-04

SOIL INFILTRATION RATE CALCULATIONS

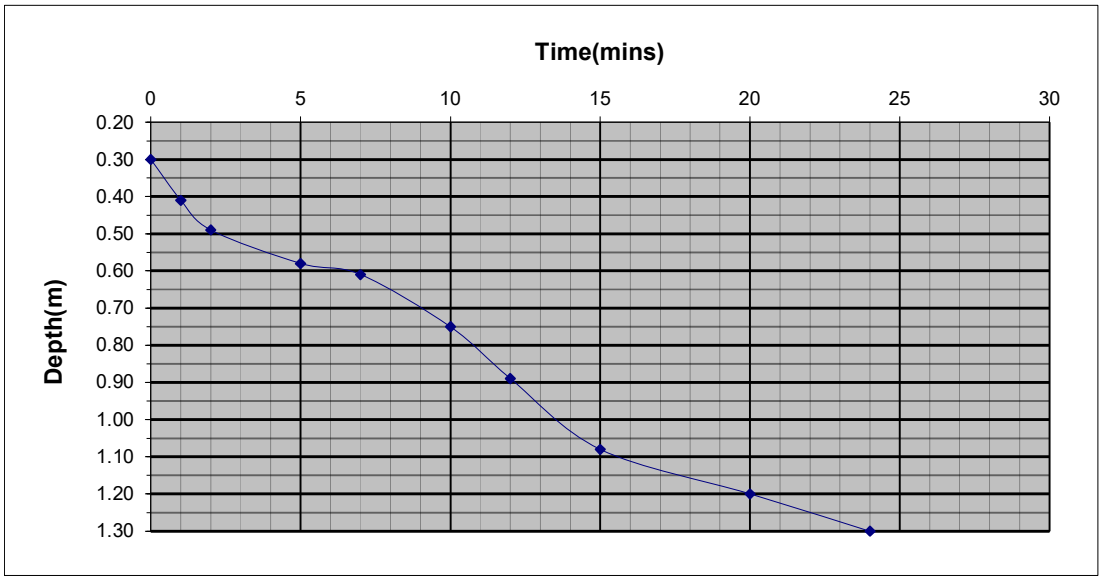
SA01a **Soakaway Test 3**

Time(mins)	Depth(m)
0	0.300
1	0.410
2	0.490
5	0.580
7	0.610
10	0.750
12	0.890
15	1.080
20	1.200
24	1.300

Client :	E P Barrus Limited
Site :	Launton Road, Bicester
Site ref :	GML23101

Trial pit dimensions			
Width(m)	Length(m)	Depth(m)	Gravel (Yes / No)
0.60	1.30	1.30	No

Depth from water level at start of test to bottom of pit =	1.00



75% effective depth(m)	=	0.5500	Time at 75% effective depth(mins)	=	4
25% effective depth(m)	=	1.0500	Time at 25% effective depth(mins)	=	14

Volume outflowing, V_{p75-25} =	0.39
Area, a_{p50} =	2.68
Time, T_{75-25} =	10.3
Infiltration Rate, F =	2.37E-04

SOIL INFILTRATION RATE CALCULATIONS

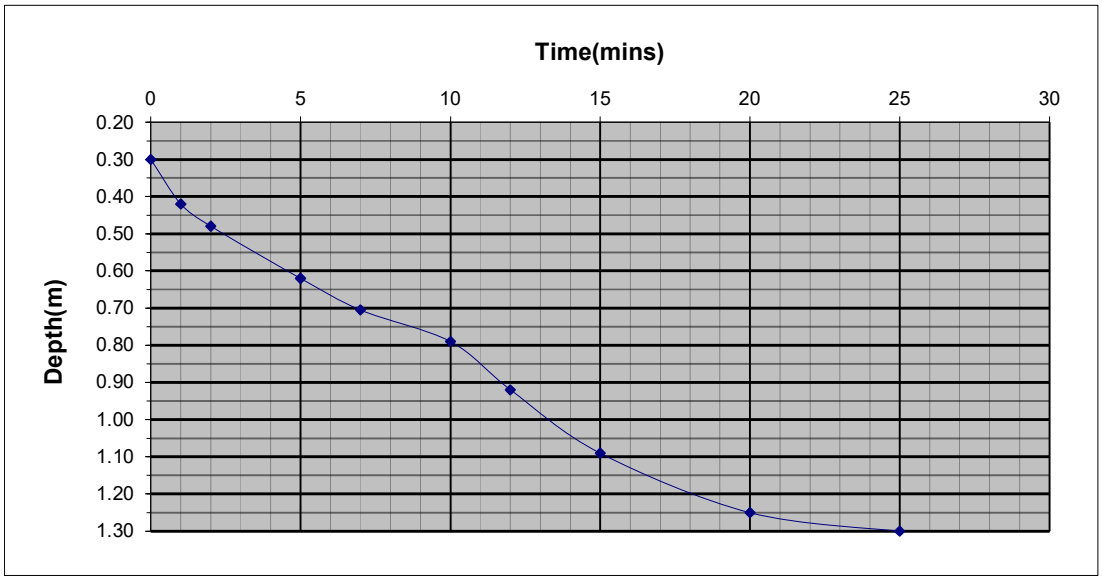
SA01a **Soakaway Test 2**

Time(mins)	Depth(m)
0	0.300
1	0.420
2	0.480
5	0.620
7	0.705
10	0.790
12	0.920
15	1.090
20	1.250
25	1.300

Client :	E P Barrus Limited
Site :	Launton Road, Bicester
Site ref :	GML23101

Trial pit dimensions			
Width(m)	Length(m)	Depth(m)	Gravel (Yes / No)
0.60	1.30	1.30	No

Depth from water level at start of test to bottom of pit =	1.00



75% effective depth(m)	=	0.5500	Time at 75% effective depth(mins)	=	4
25% effective depth(m)	=	1.0500	Time at 25% effective depth(mins)	=	14

Volume outflowing, V_{p75-25} =	0.39
Area, a_{p50} =	2.68
Time, T_{75-25} =	10.5
Infiltration Rate, F =	2.31E-04

APPENDIX G

Soakaway Hydraulic Calculations

Summary of Results for 10 year Return Period

Half Drain Time : 21 minutes.

Storm Event	Max Level (m)	Max Depth (m)	Max Infiltration (l/s)	Max Volume (m³)	Status
15 min Summer	67.495	0.245	2.4	4.5	O K
30 min Summer	67.526	0.276	2.5	5.1	O K
60 min Summer	67.520	0.270	2.5	5.0	O K
120 min Summer	67.478	0.228	2.4	4.2	O K
180 min Summer	67.434	0.184	2.3	3.4	O K
240 min Summer	67.397	0.147	2.3	2.7	O K
360 min Summer	67.340	0.090	2.1	1.7	O K
480 min Summer	67.308	0.058	2.1	1.1	O K
600 min Summer	67.296	0.046	1.9	0.9	O K
720 min Summer	67.291	0.041	1.7	0.8	O K
960 min Summer	67.283	0.033	1.4	0.6	O K
1440 min Summer	67.275	0.025	1.0	0.5	O K
2160 min Summer	67.268	0.018	0.8	0.3	O K
2880 min Summer	67.265	0.015	0.6	0.3	O K
4320 min Summer	67.261	0.011	0.4	0.2	O K
5760 min Summer	67.259	0.009	0.4	0.2	O K
7200 min Summer	67.257	0.007	0.3	0.1	O K
8640 min Summer	67.256	0.006	0.3	0.1	O K
10080 min Summer	67.256	0.006	0.2	0.1	O K
15 min Winter	67.531	0.281	2.5	5.2	O K

Storm Event	Rain (mm/hr)	Flooded Volume (m³)	Time-Peak (mins)
15 min Summer	59.937	0.0	18
30 min Summer	38.718	0.0	27
60 min Summer	24.003	0.0	44
120 min Summer	14.508	0.0	78
180 min Summer	10.722	0.0	110
240 min Summer	8.627	0.0	140
360 min Summer	6.339	0.0	198
480 min Summer	5.090	0.0	254
600 min Summer	4.291	0.0	310
720 min Summer	3.732	0.0	370
960 min Summer	2.993	0.0	490
1440 min Summer	2.191	0.0	730
2160 min Summer	1.603	0.0	1088
2880 min Summer	1.283	0.0	1456
4320 min Summer	0.938	0.0	2192
5760 min Summer	0.751	0.0	2896
7200 min Summer	0.631	0.0	3600
8640 min Summer	0.548	0.0	4256
10080 min Summer	0.486	0.0	5032
15 min Winter	59.937	0.0	18

Summary of Results for 10 year Return Period

Storm Event	Max Level (m)	Max Depth (m)	Max Infiltration (l/s)	Max Volume (m³)	Status
30 min Winter	67.568	0.318	2.6	5.9	O K
60 min Winter	67.554	0.304	2.6	5.6	O K
120 min Winter	67.486	0.236	2.4	4.4	O K
180 min Winter	67.420	0.170	2.3	3.1	O K
240 min Winter	67.366	0.116	2.2	2.1	O K
360 min Winter	67.301	0.051	2.1	0.9	O K
480 min Winter	67.291	0.041	1.7	0.8	O K
600 min Winter	67.285	0.035	1.4	0.6	O K
720 min Winter	67.280	0.030	1.2	0.6	O K
960 min Winter	67.274	0.024	1.0	0.4	O K
1440 min Winter	67.268	0.018	0.7	0.3	O K
2160 min Winter	67.263	0.013	0.5	0.2	O K
2880 min Winter	67.261	0.011	0.4	0.2	O K
4320 min Winter	67.258	0.008	0.3	0.1	O K
5760 min Winter	67.256	0.006	0.3	0.1	O K
7200 min Winter	67.255	0.005	0.2	0.1	O K
8640 min Winter	67.255	0.005	0.2	0.1	O K
10080 min Winter	67.254	0.004	0.2	0.1	O K

Storm Event	Rain (mm/hr)	Flooded Volume (m³)	Time-Peak (mins)
30 min Winter	38.718	0.0	29
60 min Winter	24.003	0.0	48
120 min Winter	14.508	0.0	84
180 min Winter	10.722	0.0	116
240 min Winter	8.627	0.0	146
360 min Winter	6.339	0.0	192
480 min Winter	5.090	0.0	250
600 min Winter	4.291	0.0	310
720 min Winter	3.732	0.0	370
960 min Winter	2.993	0.0	492
1440 min Winter	2.191	0.0	738
2160 min Winter	1.603	0.0	1120
2880 min Winter	1.283	0.0	1432
4320 min Winter	0.938	0.0	2188
5760 min Winter	0.751	0.0	2872
7200 min Winter	0.631	0.0	3560
8640 min Winter	0.548	0.0	4312
10080 min Winter	0.486	0.0	4872

Rainfall Details

Rainfall Model	FSR	Winter Storms	Yes
Return Period (years)	10	Cv (Summer)	0.750
Region	England and Wales	Cv (Winter)	0.840
M5-60 (mm)	20.000	Shortest Storm (mins)	15
Ratio R	0.400	Longest Storm (mins)	10080
Summer Storms	Yes	Climate Change %	+0

Time Area Diagram

Total Area (ha) 0.057

Time From: (mins)	To:	Area (ha)	Time From: (mins)	To:	Area (ha)
0	4	0.029	4	8	0.028

Model Details

Storage is Online Cover Level (m) 69.600

Cellular Storage Structure

Invert Level (m) 67.250 Safety Factor 2.0
Infiltration Coefficient Base (m/hr) 0.72720 Porosity 0.95
Infiltration Coefficient Side (m/hr) 0.72720

Depth (m)	Area (m²)	Inf. Area (m²)	Depth (m)	Area (m²)	Inf. Area (m²)
0.000	19.5	19.5	1.100	0.0	38.5
1.000	19.5	38.5			

Summary of Results for 30 year Return Period

Half Drain Time : 27 minutes.

Storm Event	Max Level (m)	Max Depth (m)	Max Infiltration (l/s)	Max Volume (m³)	Status
15 min Summer	67.578	0.328	2.6	6.1	O K
30 min Summer	67.627	0.377	2.7	7.0	O K
60 min Summer	67.630	0.380	2.7	7.0	O K
120 min Summer	67.586	0.336	2.6	6.2	O K
180 min Summer	67.537	0.287	2.5	5.3	O K
240 min Summer	67.490	0.240	2.4	4.4	O K
360 min Summer	67.414	0.164	2.3	3.0	O K
480 min Summer	67.359	0.109	2.2	2.0	O K
600 min Summer	67.323	0.073	2.1	1.3	O K
720 min Summer	67.302	0.052	2.1	1.0	O K
960 min Summer	67.292	0.042	1.7	0.8	O K
1440 min Summer	67.281	0.031	1.3	0.6	O K
2160 min Summer	67.272	0.022	0.9	0.4	O K
2880 min Summer	67.268	0.018	0.7	0.3	O K
4320 min Summer	67.263	0.013	0.5	0.2	O K
5760 min Summer	67.260	0.010	0.4	0.2	O K
7200 min Summer	67.259	0.009	0.4	0.2	O K
8640 min Summer	67.258	0.008	0.3	0.1	O K
10080 min Summer	67.257	0.007	0.3	0.1	O K
15 min Winter	67.624	0.374	2.7	6.9	O K

Storm Event	Rain (mm/hr)	Flooded Volume (m³)	Time-Peak (mins)
15 min Summer	76.035	0.0	18
30 min Summer	49.499	0.0	29
60 min Summer	30.811	0.0	46
120 min Summer	18.615	0.0	80
180 min Summer	13.715	0.0	112
240 min Summer	10.995	0.0	144
360 min Summer	8.034	0.0	206
480 min Summer	6.428	0.0	264
600 min Summer	5.404	0.0	318
720 min Summer	4.687	0.0	372
960 min Summer	3.743	0.0	492
1440 min Summer	2.723	0.0	734
2160 min Summer	1.979	0.0	1100
2880 min Summer	1.577	0.0	1468
4320 min Summer	1.143	0.0	2152
5760 min Summer	0.910	0.0	2936
7200 min Summer	0.762	0.0	3672
8640 min Summer	0.659	0.0	4320
10080 min Summer	0.583	0.0	5056
15 min Winter	76.035	0.0	19

Summary of Results for 30 year Return Period

Storm Event	Max Level (m)	Max Depth (m)	Max Infiltration (l/s)	Max Volume (m³)	Status
30 min Winter	67.686	0.436	2.8	8.1	O K
60 min Winter	67.683	0.433	2.8	8.0	O K
120 min Winter	67.614	0.364	2.7	6.7	O K
180 min Winter	67.538	0.288	2.5	5.3	O K
240 min Winter	67.469	0.219	2.4	4.1	O K
360 min Winter	67.365	0.115	2.2	2.1	O K
480 min Winter	67.304	0.054	2.1	1.0	O K
600 min Winter	67.294	0.044	1.8	0.8	O K
720 min Winter	67.288	0.038	1.6	0.7	O K
960 min Winter	67.281	0.031	1.3	0.6	O K
1440 min Winter	67.272	0.022	0.9	0.4	O K
2160 min Winter	67.266	0.016	0.7	0.3	O K
2880 min Winter	67.263	0.013	0.5	0.2	O K
4320 min Winter	67.260	0.010	0.4	0.2	O K
5760 min Winter	67.258	0.008	0.3	0.1	O K
7200 min Winter	67.256	0.006	0.3	0.1	O K
8640 min Winter	67.256	0.006	0.2	0.1	O K
10080 min Winter	67.255	0.005	0.2	0.1	O K

Storm Event	Rain (mm/hr)	Flooded Volume (m³)	Time-Peak (mins)
30 min Winter	49.499	0.0	30
60 min Winter	30.811	0.0	48
120 min Winter	18.615	0.0	86
180 min Winter	13.715	0.0	120
240 min Winter	10.995	0.0	152
360 min Winter	8.034	0.0	212
480 min Winter	6.428	0.0	258
600 min Winter	5.404	0.0	310
720 min Winter	4.687	0.0	370
960 min Winter	3.743	0.0	492
1440 min Winter	2.723	0.0	728
2160 min Winter	1.979	0.0	1080
2880 min Winter	1.577	0.0	1448
4320 min Winter	1.143	0.0	2188
5760 min Winter	0.910	0.0	2904
7200 min Winter	0.762	0.0	3592
8640 min Winter	0.659	0.0	4440
10080 min Winter	0.583	0.0	5112

Rainfall Details

Rainfall Model	FSR	Winter Storms	Yes
Return Period (years)	30	Cv (Summer)	0.750
Region	England and Wales	Cv (Winter)	0.840
M5-60 (mm)	20.000	Shortest Storm (mins)	15
Ratio R	0.400	Longest Storm (mins)	10080
Summer Storms	Yes	Climate Change %	+0

Time Area Diagram

Total Area (ha) 0.057

Time From: (mins)	To:	Area (ha)	Time From: (mins)	To:	Area (ha)
0	4	0.029	4	8	0.028

Model Details

Storage is Online Cover Level (m) 69.600

Cellular Storage Structure

Invert Level (m) 67.250 Safety Factor 2.0
Infiltration Coefficient Base (m/hr) 0.72720 Porosity 0.95
Infiltration Coefficient Side (m/hr) 0.72720

Depth (m)	Area (m²)	Inf. Area (m²)	Depth (m)	Area (m²)	Inf. Area (m²)
0.000	19.5	19.5	1.100	0.0	38.5
1.000	19.5	38.5			

Summary of Results for 100 year Return Period

Half Drain Time : 36 minutes.

Storm Event	Max Level (m)	Max Depth (m)	Max Infiltration (l/s)	Max Volume (m³)	Status
15 min Summer	67.695	0.445	2.8	8.2	O K
30 min Summer	67.776	0.526	3.0	9.7	O K
60 min Summer	67.793	0.543	3.0	10.1	O K
120 min Summer	67.750	0.500	2.9	9.3	O K
180 min Summer	67.693	0.443	2.8	8.2	O K
240 min Summer	67.637	0.387	2.7	7.2	O K
360 min Summer	67.540	0.290	2.5	5.4	O K
480 min Summer	67.464	0.214	2.4	4.0	O K
600 min Summer	67.405	0.155	2.3	2.9	O K
720 min Summer	67.360	0.110	2.2	2.0	O K
960 min Summer	67.307	0.057	2.1	1.1	O K
1440 min Summer	67.289	0.039	1.6	0.7	O K
2160 min Summer	67.278	0.028	1.2	0.5	O K
2880 min Summer	67.272	0.022	0.9	0.4	O K
4320 min Summer	67.266	0.016	0.7	0.3	O K
5760 min Summer	67.263	0.013	0.5	0.2	O K
7200 min Summer	67.261	0.011	0.4	0.2	O K
8640 min Summer	67.259	0.009	0.4	0.2	O K
10080 min Summer	67.258	0.008	0.3	0.1	O K
15 min Winter	67.757	0.507	2.9	9.4	O K

Storm Event	Rain (mm/hr)	Flooded Volume (m³)	Time-Peak (mins)
15 min Summer	98.681	0.0	19
30 min Summer	64.789	0.0	30
60 min Summer	40.510	0.0	48
120 min Summer	24.461	0.0	82
180 min Summer	17.964	0.0	116
240 min Summer	14.342	0.0	148
360 min Summer	10.418	0.0	212
480 min Summer	8.302	0.0	272
600 min Summer	6.956	0.0	330
720 min Summer	6.017	0.0	388
960 min Summer	4.784	0.0	496
1440 min Summer	3.456	0.0	734
2160 min Summer	2.493	0.0	1092
2880 min Summer	1.975	0.0	1468
4320 min Summer	1.421	0.0	2144
5760 min Summer	1.124	0.0	2880
7200 min Summer	0.936	0.0	3624
8640 min Summer	0.806	0.0	4384
10080 min Summer	0.710	0.0	5136
15 min Winter	98.681	0.0	19

Summary of Results for 100 year Return Period

Storm Event	Max Level (m)	Max Depth (m)	Max Infiltration (l/s)	Max Volume (m³)	Status
30 min Winter	67.856	0.606	3.1	11.2	O K
60 min Winter	67.875	0.625	3.2	11.6	O K
120 min Winter	67.807	0.557	3.0	10.3	O K
180 min Winter	67.720	0.470	2.9	8.7	O K
240 min Winter	67.637	0.387	2.7	7.2	O K
360 min Winter	67.501	0.251	2.5	4.6	O K
480 min Winter	67.400	0.150	2.3	2.8	O K
600 min Winter	67.329	0.079	2.1	1.5	O K
720 min Winter	67.299	0.049	2.0	0.9	O K
960 min Winter	67.289	0.039	1.6	0.7	O K
1440 min Winter	67.278	0.028	1.2	0.5	O K
2160 min Winter	67.270	0.020	0.8	0.4	O K
2880 min Winter	67.266	0.016	0.7	0.3	O K
4320 min Winter	67.262	0.012	0.5	0.2	O K
5760 min Winter	67.259	0.009	0.4	0.2	O K
7200 min Winter	67.258	0.008	0.3	0.1	O K
8640 min Winter	67.257	0.007	0.3	0.1	O K
10080 min Winter	67.256	0.006	0.3	0.1	O K

Storm Event	Rain (mm/hr)	Flooded Volume (m³)	Time-Peak (mins)
30 min Winter	64.789	0.0	31
60 min Winter	40.510	0.0	50
120 min Winter	24.461	0.0	88
180 min Winter	17.964	0.0	124
240 min Winter	14.342	0.0	158
360 min Winter	10.418	0.0	222
480 min Winter	8.302	0.0	282
600 min Winter	6.956	0.0	332
720 min Winter	6.017	0.0	370
960 min Winter	4.784	0.0	492
1440 min Winter	3.456	0.0	726
2160 min Winter	2.493	0.0	1104
2880 min Winter	1.975	0.0	1456
4320 min Winter	1.421	0.0	2180
5760 min Winter	1.124	0.0	2904
7200 min Winter	0.936	0.0	3568
8640 min Winter	0.806	0.0	4344
10080 min Winter	0.710	0.0	5064

Rainfall Details

Rainfall Model	FSR	Winter Storms	Yes
Return Period (years)	100	Cv (Summer)	0.750
Region	England and Wales	Cv (Winter)	0.840
M5-60 (mm)	20.000	Shortest Storm (mins)	15
Ratio R	0.400	Longest Storm (mins)	10080
Summer Storms	Yes	Climate Change %	+0

Time Area Diagram

Total Area (ha) 0.057

Time From: (mins)	To:	Area (ha)	Time From: (mins)	To:	Area (ha)
0	4	0.029	4	8	0.028

Model Details

Storage is Online Cover Level (m) 69.600

Cellular Storage Structure

Invert Level (m) 67.250 Safety Factor 2.0
Infiltration Coefficient Base (m/hr) 0.72720 Porosity 0.95
Infiltration Coefficient Side (m/hr) 0.72720

Depth (m)	Area (m²)	Inf. Area (m²)	Depth (m)	Area (m²)	Inf. Area (m²)
0.000	19.5	19.5	1.100	0.0	38.5
1.000	19.5	38.5			

Summary of Results for 100 year Return Period (+40%)

Half Drain Time : 47 minutes.

Storm Event	Max Level (m)	Max Depth (m)	Max Infiltration (l/s)	Max Volume (m³)	Status
15 min Summer	67.903	0.653	3.2	12.1	O K
30 min Summer	68.036	0.786	3.5	14.6	O K
60 min Summer	68.080	0.830	3.6	15.4	O K
120 min Summer	68.040	0.790	3.5	14.6	O K
180 min Summer	67.975	0.725	3.4	13.4	O K
240 min Summer	67.909	0.659	3.2	12.2	O K
360 min Summer	67.791	0.541	3.0	10.0	O K
480 min Summer	67.693	0.443	2.8	8.2	O K
600 min Summer	67.610	0.360	2.7	6.7	O K
720 min Summer	67.540	0.290	2.5	5.4	O K
960 min Summer	67.433	0.183	2.3	3.4	O K
1440 min Summer	67.315	0.065	2.1	1.2	O K
2160 min Summer	67.289	0.039	1.6	0.7	O K
2880 min Summer	67.281	0.031	1.3	0.6	O K
4320 min Summer	67.273	0.023	0.9	0.4	O K
5760 min Summer	67.268	0.018	0.7	0.3	O K
7200 min Summer	67.265	0.015	0.6	0.3	O K
8640 min Summer	67.263	0.013	0.5	0.2	O K
10080 min Summer	67.261	0.011	0.5	0.2	O K
15 min Winter	67.991	0.741	3.4	13.7	O K

Storm Event	Rain (mm/hr)	Flooded Volume (m³)	Time-Peak (mins)
15 min Summer	138.153	0.0	19
30 min Summer	90.705	0.0	31
60 min Summer	56.713	0.0	50
120 min Summer	34.246	0.0	84
180 min Summer	25.149	0.0	118
240 min Summer	20.078	0.0	152
360 min Summer	14.585	0.0	218
480 min Summer	11.622	0.0	280
600 min Summer	9.738	0.0	342
720 min Summer	8.424	0.0	402
960 min Summer	6.697	0.0	520
1440 min Summer	4.839	0.0	740
2160 min Summer	3.490	0.0	1100
2880 min Summer	2.766	0.0	1448
4320 min Summer	1.989	0.0	2196
5760 min Summer	1.573	0.0	2848
7200 min Summer	1.311	0.0	3672
8640 min Summer	1.129	0.0	4400
10080 min Summer	0.994	0.0	5040
15 min Winter	138.153	0.0	19

Summary of Results for 100 year Return Period (+40%)

Storm Event	Max Level (m)	Max Depth (m)	Max Infiltration (l/s)	Max Volume (m³)	Status
30 min Winter	68.150	0.900	3.7	16.7	O K
60 min Winter	68.206	0.956	3.8	17.7	O K
120 min Winter	68.145	0.895	3.7	16.6	O K
180 min Winter	68.047	0.797	3.5	14.8	O K
240 min Winter	67.949	0.699	3.3	12.9	O K
360 min Winter	67.779	0.529	3.0	9.8	O K
480 min Winter	67.644	0.394	2.7	7.3	O K
600 min Winter	67.534	0.284	2.5	5.3	O K
720 min Winter	67.446	0.196	2.3	3.6	O K
960 min Winter	67.325	0.075	2.1	1.4	O K
1440 min Winter	67.289	0.039	1.6	0.7	O K
2160 min Winter	67.279	0.029	1.2	0.5	O K
2880 min Winter	67.273	0.023	0.9	0.4	O K
4320 min Winter	67.266	0.016	0.7	0.3	O K
5760 min Winter	67.263	0.013	0.5	0.2	O K
7200 min Winter	67.261	0.011	0.4	0.2	O K
8640 min Winter	67.259	0.009	0.4	0.2	O K
10080 min Winter	67.258	0.008	0.3	0.2	O K

Storm Event	Rain (mm/hr)	Flooded Volume (m³)	Time-Peak (mins)
30 min Winter	90.705	0.0	32
60 min Winter	56.713	0.0	52
120 min Winter	34.246	0.0	90
180 min Winter	25.149	0.0	128
240 min Winter	20.078	0.0	162
360 min Winter	14.585	0.0	230
480 min Winter	11.622	0.0	296
600 min Winter	9.738	0.0	356
720 min Winter	8.424	0.0	416
960 min Winter	6.697	0.0	520
1440 min Winter	4.839	0.0	736
2160 min Winter	3.490	0.0	1092
2880 min Winter	2.766	0.0	1432
4320 min Winter	1.989	0.0	2128
5760 min Winter	1.573	0.0	2920
7200 min Winter	1.311	0.0	3576
8640 min Winter	1.129	0.0	4352
10080 min Winter	0.994	0.0	4952

Rainfall Details

Rainfall Model	FSR	Winter Storms	Yes
Return Period (years)	100	Cv (Summer)	0.750
Region	England and Wales	Cv (Winter)	0.840
M5-60 (mm)	20.000	Shortest Storm (mins)	15
Ratio R	0.400	Longest Storm (mins)	10080
Summer Storms	Yes	Climate Change %	+40

Time Area Diagram

Total Area (ha) 0.057

Time From: (mins)	To: (mins)	Area (ha)	Time From: (mins)	To: (mins)	Area (ha)
0	4	0.029	4	8	0.028

Model Details

Storage is Online Cover Level (m) 69.600

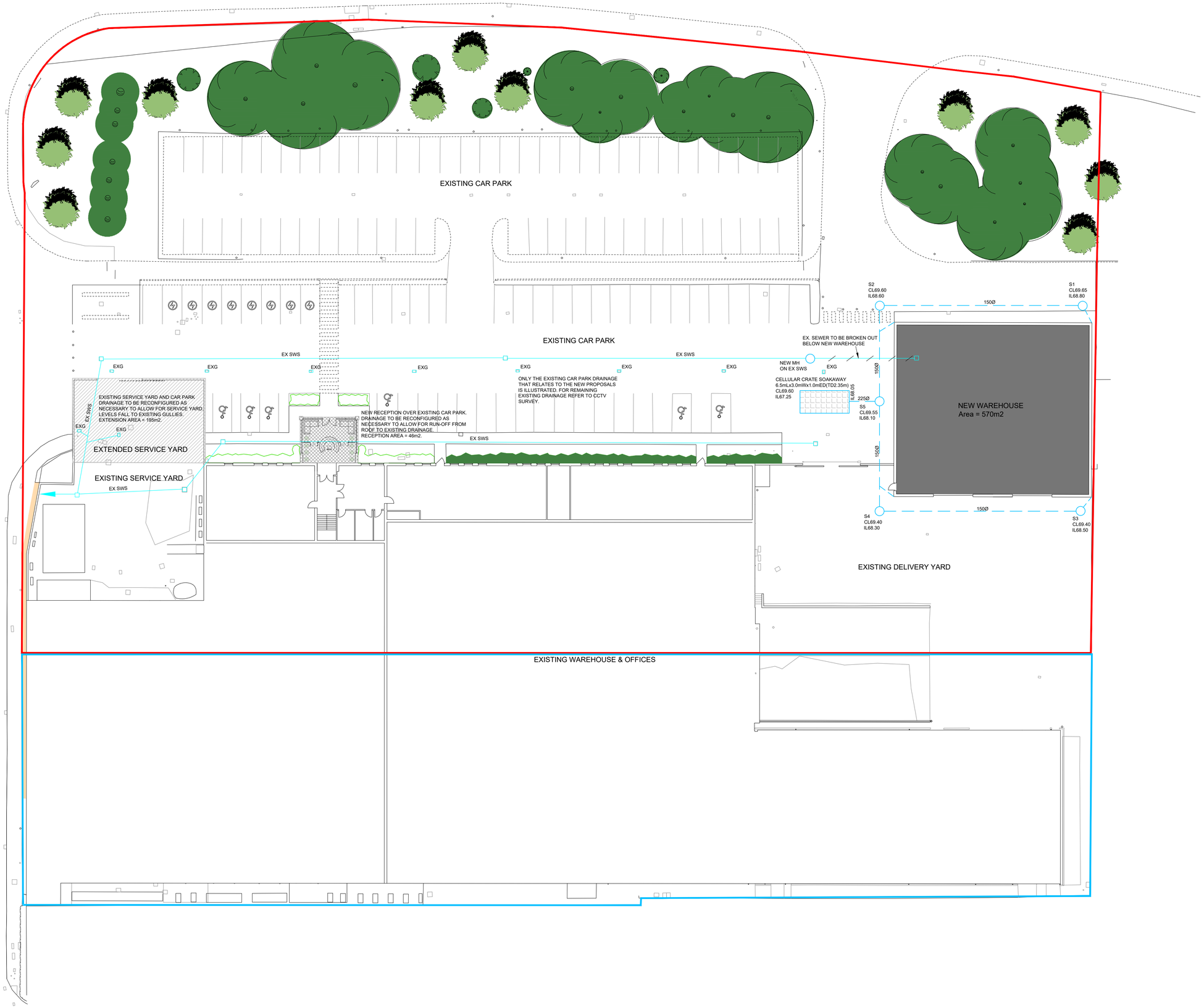
Cellular Storage Structure

Invert Level (m) 67.250 Safety Factor 2.0
Infiltration Coefficient Base (m/hr) 0.72720 Porosity 0.95
Infiltration Coefficient Side (m/hr) 0.72720

Depth (m)	Area (m²)	Inf. Area (m²)	Depth (m)	Area (m²)	Inf. Area (m²)
0.000	19.5	19.5	1.100	0.0	38.5
1.000	19.5	38.5			

APPENDIX H

Drainage Layout



Armstrong Stokes & Clayton Limited

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NOTES

DO NOT SCALE FROM THIS DRAWING. ALL DIMENSIONS MUST BE CHECKED/VERIFIED ON SITE

LEGEND

- Proposed Surface Water Sewer
- Existing Surface Water Sewer & MH
- Existing Sewer to be abandoned
- EXG — Existing Gully
- LxWxED[TD] (ED = Effective Depth, TD = Total Depth) — Proposed Cellular Soakaway (vented). Polystorm or similar approved type. (a protective concrete cover slab may be required subject to manufactures recommendations)
- Application Site
- Adjoining Land Ownership
- New Warehouse Area = 570m2
- New (extended) Service Yard replacing existing car park Area = 195m2
- New Reception replacing existing car park Area = 46m2

ALL DRAINAGE TO BE CONSTRUCTED IN ACCORDANCE WITH PART H OF THE CURRENT BUILDING REGULATIONS.

ALL SEWERS 100 DIA. UNLESS OTHERWISE STATED.

CELLULAR SOAKAWAY TO BE SUITABLY VENTED IN ACCORDANCE WITH MANUFACTURES SPECIFICATION.

CELLULAR SOAKAWAY TO BE LOCATED A MINIMUM OF 5.0m FROM ANY BUILDING.

FINAL DRAINAGE PROPOSALS SUBJECT TO DETAILED DESIGN.

A Application boundaries and notation added — Aug 23

Armstrong Stokes & Clayton Limited

Civil & Structural Engineering Consultants

Regus House, Herald Way, Pegasus Business Park, Castle Donington, Derbyshire, DE74 2TZ

Tel: 01159 417 893

Client:

EP Barrus Ltd

Job Title:

Proposed Development at Launton Road
Bicester
Oxfordshire

Drawing Title:

Surface Water Drainage Plan (Preliminary)

Drawing number:

FRA115/100A/P

Drawn:	Date:	Scale:	
JS	June 23	1:250	A1

Preliminary	Detailed	Tender	As Built
■	□	□	□

APPENDIX I

Maintenance and Management Plan

Maintenance Strategy for Below Ground Surface Water Drainage

Glen Way, Launton Road, Bicester, Oxfordshire

Cellular Soakaway & Below Ground Drainage

The development's surface water drainage system will encompass a cellular crate soakaway, which will discharge surface water to ground from the roof of the new warehouse. The soakaway is designed to accommodate rainfall events up to and including the 100 year storm with an additional allowance of 40% for climate change. This is further supported by ancillary small bore pipework. The below ground drainage system is designed to be self-cleansing and thus laid to a fall that prevents silting of the network. Therefore, other than routine inspections, minimal maintenance will be required.

Maintenance

The method of maintenance for cellular crate soakaways is to be in accordance with the CIRIA C753 SuDS MANUAL Chapter 13 and Chapter 21, along with the manufacturer's specification. For cellular structures this will include:

Maintenance schedule	Required action	Typical frequency
Regular maintenance	Inspect and identify any areas that are not operating correctly. If required, take remedial action	Monthly for 3 months, then annually
	Remove debris from the catchment surface (where it may cause risks to performance)	Monthly
	For systems where rainfall infiltrates into the tank from above, check surface of filter for blockage by sediment, algae or other matter; remove and replace surface infiltration medium as necessary.	Annually
	Remove sediment from pre-treatment structures and/ or internal forebays	Annually, or as required
Remedial actions	Repair/rehabilitate inlets, outlet, overflows and vents	As required
Monitoring	Inspect/check all inlets, outlets, vents and overflows to ensure that they are in good condition and operating as designed	Annually
	Survey inside of tank for sediment build-up and remove if necessary	Every 5 years or as required

As the cellular structure operates as a soakaway, additional maintenance actions should be included where applicable, as highlighted below:

Operation and maintenance requirements for soakaways		
Maintenance schedule	**Required action**	**Typical frequency**
Regular maintenance	Inspect for sediment and debris in pre-treatment components and floor of inspection tube or chamber and inside of concrete manhole rings	Annually
	Cleaning of gutters and any filters on downpipes	Annually (or as required based on inspections)
	Trimming any roots that may be causing blockages	Annually (or as required)
Occasional maintenance	Remove sediment and debris from pre-treatment components and floor of inspection tube or chamber and inside of concrete manhole rings	As required, based on inspections
Remedial actions	Reconstruct soakaway and/or replace or clean void fill, if performance deteriorates or failure occurs	As required
	Replacement of clogged geotextile (will require reconstruction of soakaway)	As required
Monitoring	Inspect silt traps and note rate of sediment accumulation	Monthly in the first year and then annually
	Check soakaway to ensure emptying is occurring	Annually

With regards to the small bore pipe network, the pipework and associated manhole structures, including covers, should be inspected annually for evidence of debris, damage and poor operation, and where required, pipework should be cleansed and any damage to pipework or associated structures should be repaired or replaced.

Maintenance Responsibility

The responsibility for the management and maintenance of the surface water drainage system for the lifetime of the development will fall with E.P Barrus Ltd as part of their existing site wide maintenance strategy programme.