# DUXFORD PRIMARY SCHOOL
# DRAINAGE STRATEGY

For

## Kier Construction - Eastern

Job Number: 10-9757
Date: February 2022

**NOTICE**

This document and its contents have been prepared and are intended solely for Kier Construction information and use in relation to the Drainage Strategy.

Peter Dann Limited assumes no responsibility to any other party in respect of or arising out of or in connection with this document and/or its contents.

**Document history**

| Job number: 10-9757 | | | Document No. CVC3-PDL-ZZ-XX-RP-S-003 | | |
|---|---|---|---|---|---|
| Revision | Purpose description | Originated | Checked | Reviewed | Date |
| A | Planning | SM | MD | JB | 24/08/21 |
| B | Planning | SM | MD | JB | 23/02/22 |
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**CONTENTS**

## 1 INTRODUCTION

Peter Dann Limited has been commissioned by Kier Construction to prepare a Drainage Strategy to support a planning application for the proposed new teaching facility at Duxford Primary School.

The purpose of this drainage strategy is to demonstrate how this increase in impermeable area can be satisfactorily drained without increasing flood risk onsite and elsewhere. The strategy has been developed in full accordance with Local and National standards as well as best practice design guidance.

Specifically, this surface water strategy demonstrates that the extension and refurbishment works proposed do not lead to an increase in;

- Peak runoff rate of storm water runoff leaving the site
- Volume of runoff leaving the site
- Pollution to receiving waters from storm water runoff
- Flood risk to nearby or neighbouring sites

## 2 EXISTING SITE

### 2.1 Site Location and Surrounding Drainage

Duxford Primary School is located on St. Johns Street in Duxford. The site is centred within a grid reference TL 47607 46069. The site is bound by a residential area and public park to the north, a residential area to the east, community centre and playing fields to the south and agricultural land to the west.

A site location plan showing the site and surrounding area is provided in **Appendix A.**

### 2.2 Site Topography

A topographical survey and utilities survey were undertaken by Survey Solutions in February 2021. A copy of the topographical survey (drawing no. 27841ea-01) and the utilities survey (drawing no. 27841UG-01) are included in **Appendix B.**

The topographical survey identifies the grounds to be fall from southwest to northeast, with levels falling from approximately 35.20 to 33.50 metres above Ordnance Datum.

### 2.3 Geology

The 1:50,000 online British Geological Survey (BGS) map suggests the site is underlain by the Holywell Nodular Chalk Formation.

Infiltration testing has been undertaken as part of the ground investigation by SWECO, dated July 2021, in full accordance with BRE 365 infiltration testing. Groundwater was recorded at a depth of 4.83m below ground level. The results of the testing are enclosed in **Appendix C**.

### 2.4 Hydrology and Hydrogeology

No watercourses are located within the site boundary of the primary school. The closest significant surface water feature is the River Cam, approximately 413m to the east of the site.

### 2.5 Existing Drainage

On review of the Survey Solutions Utilities and CCTV Drainage Survey dated March 2021 no definitive surface water system is proved for the current development. Surface water drainage from existing buildings is indicated to discharge via downpipes to above ground and run to areas of soft, or discharge directly into the ground and then possibly to local soakaways. External hard landscaped areas is indicated to drain to gullies or channel drainage and then possibly to local soakaways. The Anglian Water asset map does not indicate any public surface water sewers within the vicinity of the site, ref **Appendix D**. With no water courses within the vicinity of the site it is assumed that all surface water from building and external hard landscaping discharges via infiltration methods.

The Anglian Water asset plan indicates a foul water manhole ref 6104 located in St John's Street which runs adjacent to the northwest of the site. On review of the Survey Solutions Utilities and CCTV Drainage Survey dated March 2021 a gravity outfall to the for the foul water drainage is indicated to connect to the Anglian Water System in St John's Street.

## 3 PROPOSED SURFACE WATER DRAINAGE

### 3.1 Development Proposals

The main elements of the development which require drainage include the following:

- Proposed Primary School Extension 780m$^2$ in footprint area.
- Proposed Pre-School 213m$^2$ in footprint area.

Due to the general redevelopment of much of the area, a portion of the existing impermeable area will be replaced with proposed impermeable areas.

Table 1 below compares the extent of impermeable area generated from the development proposals with the existing scenario;

| | Existing Development | Proposed Development | Difference |
|---|---|---|---|
| **Total Impermeable Area (ha)** | 0.702ha | 0.733ha | +0.031ha |

*Table 1 – Comparison of impermeable area between existing and proposed developed site*

Peter Dann drawing C-2010 enclosed in **Appendix E** shows the existing and proposed impermeable areas.

### 3.2 Surface Water Policy and Best Practice

The proposed Surface water drainage strategy has been primarily designed in accordance with the following best practice drainage documentation:

- Cambridgeshire County Council (Lead Local Flood Authority) Surface Water Guidance.
- South Cambridgeshire Local Plan policies CC/8 & CC/9.
- Department for Communities and Local Government National Planning Policy Framework, 2019.
- Department for Communities and Local Government National Planning Policy Framework, 2012.
- CIRIA 753, 2015: The SuDS Manual; This document provides current best practice National guidance on the planning, design, construction, operation and maintenance of SuDS to facilitate their effective implementation within developments.
- Environment Agency publications
- Building Regulations Part H (2010); Drainage and Water Disposal.

### 3.3 Surface Water Discharge Strategy

Part H of the Building Regulations (2010) recommends that surface water run-off shall discharge to one of the following, listed in order of priority:

- An adequate soakaway or some other adequate infiltration system, or where that is not reasonably practicable,
- A watercourse, or, where that is not reasonably practicable,
- A sewer.

Infiltration testing was undertaken in full accordance with BRE 365 by Sweco UK Limited on 2nd June 2021. Infiltration rates of $1.74 \times 10^{-4}$ m/s ,$1.53 \times 10^{-4}$ and $1.32 \times 10^{-4}$ m/s were measured proving the underlying ground conditions would be suitable for infiltration methods of surface water disposal.

An infiltration rate of $1.32 \times 10^{-4}$ m/s has been used to design all infiltration structures.

It is proposed that all access, hardstanding, and pavement areas should be designed using permeable paving, which provides a filtration system removing pollutants from vehicular traffic etc, with sufficient storage provided in the base to accommodate the design rainfall event whilst water permeates into the ground.

It is proposed that discharge from building roof areas which is a clean discharge will be directly to separate below ground soakaways.

Hydraulic Calculations of proposed infiltration storage structures indicate that even during a 1 in 100 year plus 40% climate change event, half drain down times of structures is within 24 hours as of BRE 365 methodology.

Refer to **Appendix F** for drainage strategy drawings and associated Micro-Drainage calculations.

### 3.4 Rainfall Simulation and Climate Change

This drainage strategy uses both FSR and FEH rainfall data. FSR data has been used for simulating storm event durations between 0 and 60 minutes. FEH data has been used for simulating storm event durations greater than 60 minutes.

An allowance of +40% for climate change corresponding to the 'upper end' of current legislation on climate change published by the Environment Agency has been used.

All attenuation structures taking impermeable runoff have been sized based on the 1 in 100year critical storm event plus an additional 40% allowance for climate change.

### 3.5 Runoff Rate and Volume

Infiltration disposal of surface water within the planning boundary is proposed for the entirety of proposed development, no surface water will be released outside the site boundary. On this basis, the runoff rate and volume of surface water will not be greater than the existing scenario.

### 3.6 Surface Water Treatment

It is recognised that protection of groundwater is paramount when using infiltration mechanisms to dispose of surface water.

The SuDS Manual, 2015 identifies pollution hazard levels of new development based off their proposed land use. Based on the SUDS Manual pollution hazard level categorisations, the proposed Primary School extension, Pre-School and associated hardstanding development proposals are categorised as *very low* to *low* pollution risk with minimal total suspended solids, metals and hydrocarbons contained within runoff.

The SuDS Manual identifies that *very low* to *low* pollution hazard levels can be easily addressed and mitigated using permeable pavements. Indeed, the SuDS Manual identifies permeable pavements as suitable as a sole treatment stage for up to *medium* pollution risk. This is due to the multi layers of geotextile as well as multiple pavement layers (surface course, binder, sub-base) creating a filtrating and purifying effect on runoff as it permeates through the structure.

### 3.7 Exceedance Events

Whilst is it a requirement to fully attenuate the 1 in 100year critical storm event plus 40% climate change, it is also necessary to ensure that storms which exceed this severity do not cause flooding to building areas or exacerbate flooding elsewhere.

It is proposed a number of measures will be implemented to mitigate to allow for exceedance storm events as follows;

- Final site levels will be designed to initially provide attenuation storage provision and then conveyance routes taking storm flows away from building areas and towards proposed green landscaping / grassed sports pitch areas. Green landscaped areas will be contoured to ensure exceedance runoff is accommodated fully within the site boundary. Refer to **Appendix F** for exceedance flow routes.

## 4 SURFACE WATER MANAGEMENT AND MAINTENANCE

For any surface water drainage system to operate as originally designed, it is necessary to ensure that it is adequately maintained to ensure its continued performance throughout its lifetime.

It is proposed SuDS features used within this development will be maintained and managed by a private management company.

Tables 3 and 4 below identify the proposed operation and maintenance requirements of the SuDS features used for this development.

**Table 3: Operation and Maintenance Requirements for Infiltration Soakaway**

| Maintenance Schedule | Required Action | Typical Frequency |
|---|---|---|
| Regular Maintenance | Inspect for sediment in pre-treatment components and floor of inspection tube or chamber and inside of concrete manhole rings | Annually |
| | Trimming ant roots which may cause blockage | Annually |
| Occasional maintenance | Remove sediment and debris from pre-treatment components and floor of inspection chamber and inside of concrete ring manhole | As required |
| Remedial actions | Reconstruct soakaway and or replace or clean void fill, if performance deteriorates or failure occurs | As required |
| | Replacement of clogged geotextile | As required |
| Monitoring | Inspect silt traps and note rate of sediment accumulation | Monthly in first year then annually |
| | Check soakaway to ensure emptying is occurring | Annually |

**Table 4: Operation and Maintenance Requirements for Pervious Pavements**

| Maintenance Schedule | Required Action | Typical Frequency |
|---|---|---|
| Regular Maintenance | Brushing and vacuuming (standard cosmetic sweep over whole surface) | Once a year, after autumn leaf fall, or reduced frequency as required, based on site-specific observations of clogging or manufacturer's recommendations – pay particular attention to areas where water runs onto pervious surface from adjacent impermeable areas as this area is most likely to collect the most sediment |
| Occasional Maintenance | Stabilise and mow contributing and adjacent areas | As required |
| | Removal of weeds or management using glyphosphate applied directly into the weeds by an applicator rather than spraying | As required – once per year on less frequently used pavements |
| Remedial Actions | Remediate any landscaping which, through vegetation maintenance or soil slip, has been raised to within 50mm of the level of the paving | As required |
| | Remedial work to any depressions, rutting and cracked or broken blocks considered detrimental to the structural performance or a hazard to users, and replace lost jointing material | As required |
| | Rehabilitation of surface and upper substructure by remedial sweeping | Every 10 to 15 years or as required (if infiltration performance is reduced due to significant clogging) |
| Monitoring | Initial inspection | Monthly for three months after installation |
| | Inspect for evidence of poor operation and/or weed growth – if required, take remedial action | Three-monthly, 48 hours after large storms in first six months |
| | Inspect silt accumulation rates and establish appropriate brushing frequencies | Annually |
| | Monitor inspection chambers | Annually |

## 5 CONCLUSION

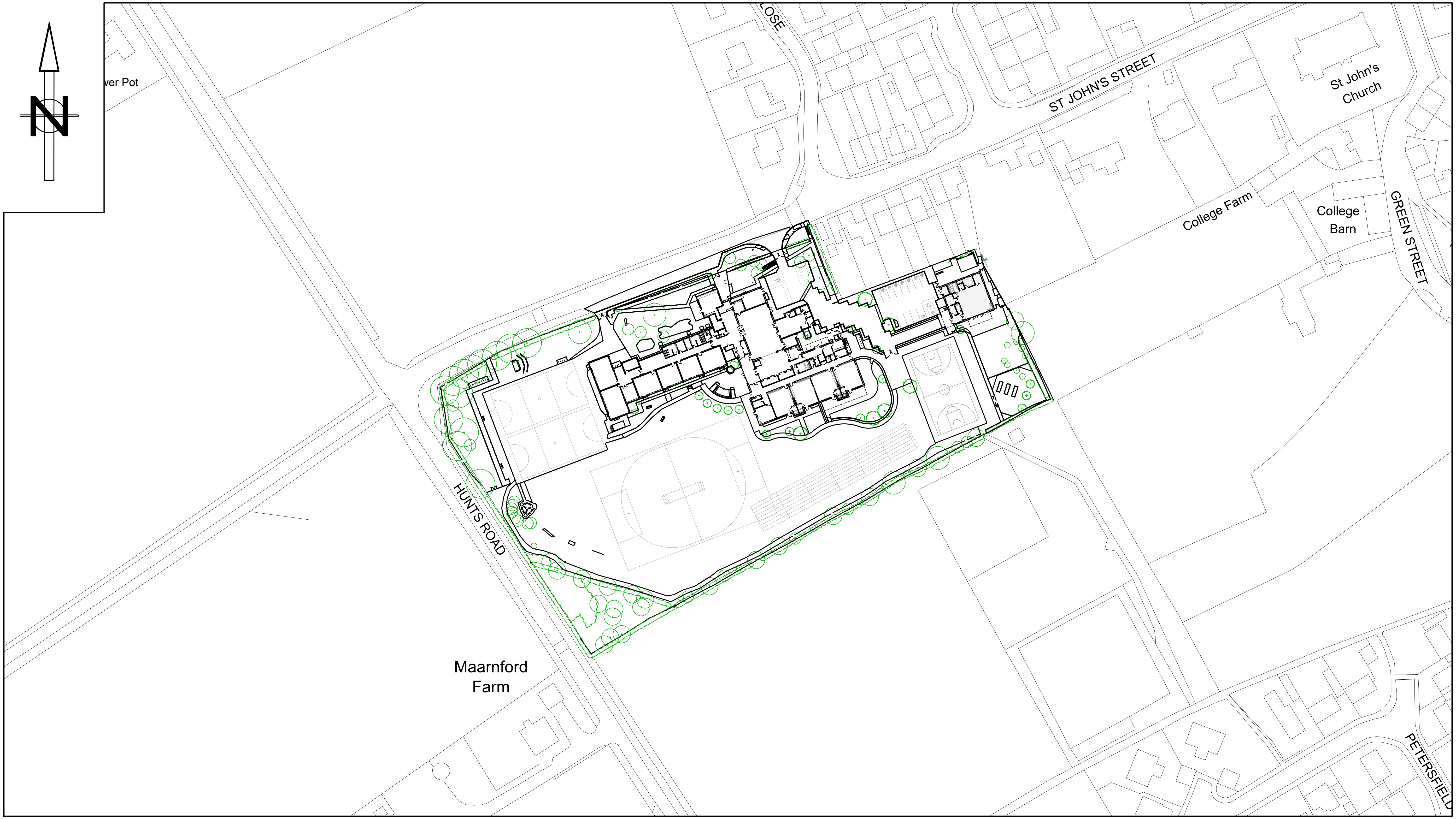
This report has been written to demonstrate how a drainage strategy for the proposed new teaching facility at Duxford Primary School and associated infrastructure, which generate an additional 0.031ha of impermeable area, can satisfactorily manage and mitigate flood risk.

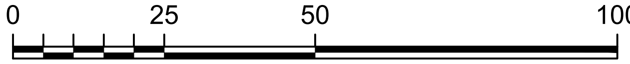
The drainage strategy proposed is in full accordance with Local and National best practice drainage guidance.

The drainage strategy proposed fully utilises infiltration to dispose of surface water via the use of permeable paving, underground geo-cellular storage crates and therefore does not increase runoff rate or volume. It demonstrates that surface water can be attenuated up to the 1 in 100 year critical storm event including for a 40% allowance for climate change and then released into groundwater without producing increased pollution hazard.

It demonstrates that if storm events greater than the 1 in 100 year were to materialise, how exceedance flows could be directed away from building areas and towards open green space allocated within development proposals.

**APPENDIX A – SITE LOCATION PLAN**




SCALE 1 : 1250

| | | | | |
|---|---|---|---|---|
| P01 | 16.08.21 | SM | JB | Initila Preliminary Issue. |
| REV | DATE | DWN | CHK | DESCRIPTION |

AMENDMENTS

NOTES.

1. This drawing is to be read in conjunction with all Peter Dann Consulting Engineers, Architects, MEP Engineers and Specialists drawings along with all relevant specifications.
2. All gridlines, building lines, etc. are to be set out in accordance with the relevant Architects drawings. Any discrepancies between the information given by the Engineer and that provided by others must be referred to the Architect before work proceeds.
3. Dimensions are NOT to be scaled from this drawing. If in doubt ask. Dimensions marked * are subject to confirmation by site measurement before construction commences.
4. All proprietary fixings shall be installed in accordance with the manufacturer's recommendations.
5. The Contractor shall comply with the health and safety requirements as set out by the CDM Regulations, THE HEALTH AND SAFETY EXECUTIVE.
6. All works are to be undertaken in accordance with the Building Regulations and latest relevant British Standards.
7. All construction products are to be CE marked in accordance with the Construction Products Regulation (EU) No. 305/2011.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consulting engineers

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# Duxford Primary School
# Site Location Plan

DRAWN SM CHECKED JB

DATE Aug '21

SCALE 1:1250 @A3

DRAWING STATUS PRELIMINARY

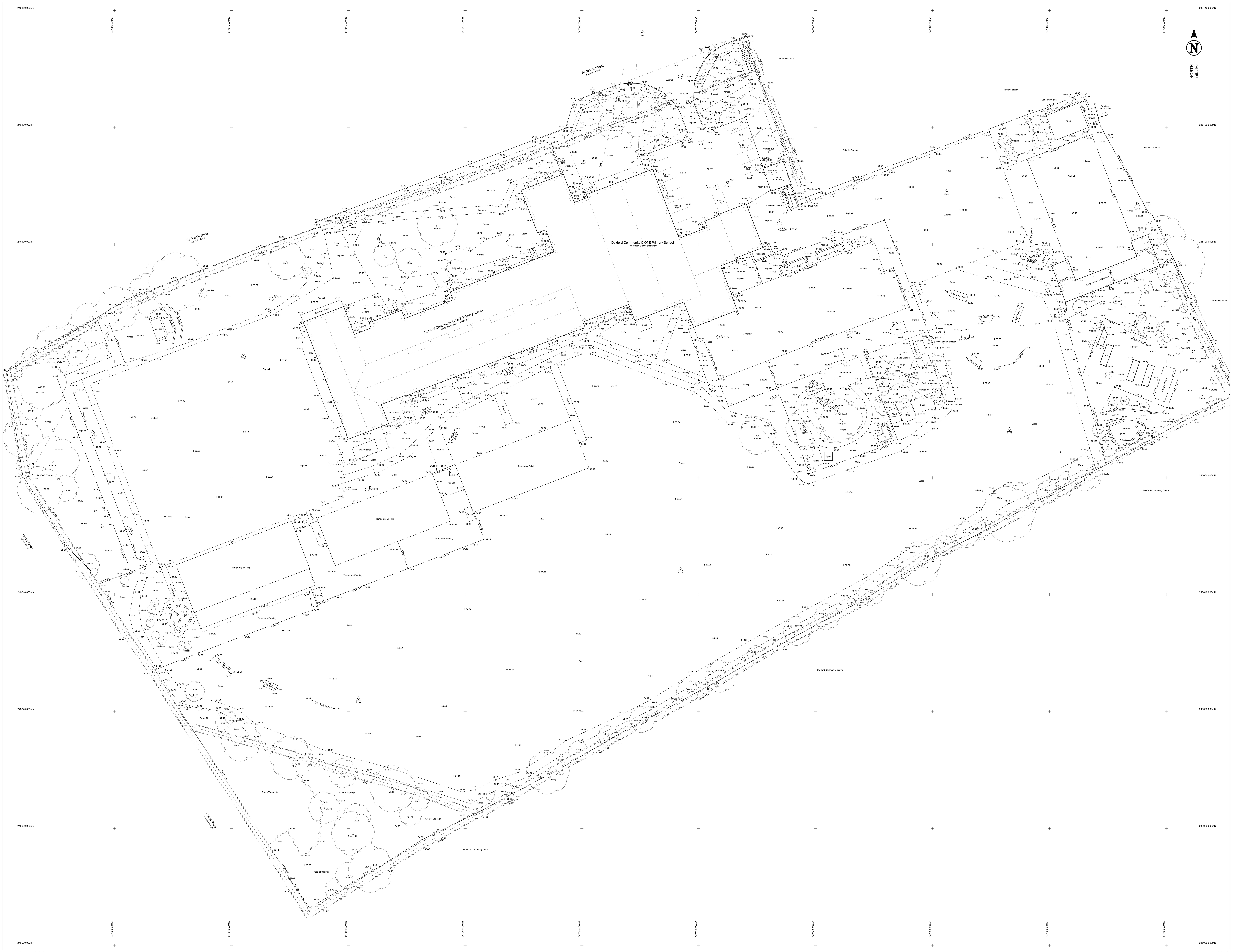
STATUS CODE S1

KIER REF-ORIGINATOR-VOLUME-LEVEL-TYPE-ROLE-NUM

DPS-PDL-XX-ZZ-DR-C-1800

REV P01

**APPENDIX B – TOPOGRAPHICAL & UTILITIES SURVEY**




# TOPOGRAPHICAL & MEASURED BUILDING SURVEYS

## ABBREVIATIONS & SYMBOLS

| | | | | | |
|---|---|---|---|---|---|
| AH | Arch Head Height | ER | Earth Rod | RSD | Roller Shutter Door |
| A/B | Air Brick | ET | EP+Transformer | RSJ | Rolled Steel Joist |
| AR | Assumed Route | FB | Flower Bed | SI | Sign Post |
| AV | Air Valve | FBD | Floor Board Direction | SP | Arch Spring Point Height |
| BB | Belisha Beacon | FH | Fire Hydrant | SV | Stop Valve |
| BH | Bore Hole | FL | Floor Level | SW | Surface Water |
| BL | Bed Level | FP | Flag Pole | SY | Cable Stay |
| BO | Bollard | FW | Foul Water | Tac | Tactile Paving |
| BrP | Brace Post | GG | Gully Grate | TC | Telecom Cover |
| BS | Bus Stop | GV | Gas Valve | TH | Trial Pit |
| BU | Bush | HH | Head Height | THL | Threshold Level |
| B/W | Barbed Wire Fence | IC | Inspection Cover | TL | Traffic Light |
| BX | Box (Utilities) | IL | Invert Level | ToW | Top of Wall |
| C/B | Close Board Fence | I/R | Iron Railings | TP | Telegraph Pole |
| CH | Cill Height | KO | Kerb Outlet | TS | Traffic Signal Cover |
| CL | Cover Level | LP | Lamp Post | TV | Cable TV Cover |
| C/L | Chain Link Fence | MH | Manhole | UB | Universal Beam |
| C-Lev | Ceiling Level | MP | Marker Post | UC | Unknown Cover |
| Col | Column | NB | Name Board | UK | Unknown Tree |
| C/P | Chestnut Paling Fence | OHL | Overhead Line (approx) | UMG | Unmade Ground |
| CR | Cable Riser | Pan | Panel Fence | USB | Under Side Beam |
| C/W | Chicken Wire | PB | Post Box | UTL | Unable To Lift |
| DC | Drainage Channel | PM | Parking Meter | UTS | Unable To Survey |
| DH | Door Head Height | PO | Post | VP | Vent Pipe |
| Dil. | Dilapidated | P/R | Post & Rail Fence | WB | Waste Bin |
| DP | Down Pipe | P/W | Post & Wire Fence | WH | Weep Hole |
| DR | Drain | P/Wall | Partition Wall | WL | Water Level |
| EBx | Electric Box | RE | Rodding Eye | WM | Water Meter |
| EC | Electric Supply Cover | RL | Ridge Level | WO | Wash Out |
| EL | Eaves Level | RP | Reflector Post | X.XX | Floor to Ceiling Height |
| EP | Electric Pole | RS | Road Sign | X.XX F/C | Floor to False Ceiling Ht |
| | | | | | Survey Control Station |

## DRAWING NOTES

### Topographical Surveys

Trees are drawn to scale showing the average canopy spread. Descriptions and heights should be used as a guide only.

All building names, descriptions, number of storeys, construction type including roof line details are indicative only and taken externally from ground level.

All below ground details including drainage, voids and services have been identified from above ground and therefore all details relating to these features including; sizes, depth, description etc will be approximate only. All critical dimensions and connections should be checked and verified prior to starting work.

Detail, services and features may not have been surveyed if obstructed or not reasonably visible at the time of the survey.

Surveyed physical features may not necessarily represent the legal boundary line.

### Measured Building Surveys

Measurements to internal walls are taken to the wall finishes at approx 1m above the floor level and the wall assumed to be vertical.

Cill heights are measured as floor to the cill and head heights are measured from cill to the top of window.

### General

The contractor must check and verify all site and building dimensions, levels, utilities and drainage details and connections prior to commencing work. Any errors or discrepancies must be notified to Survey Solutions immediately.

The accuracy of the digital data is the same as the plotting scale implies. All dimensions are in metres unless otherwise stated.

The survey control listed is only to be used for topographical surveys at the stated scale. All control must be checked and verified prior to use.



Do not scale from this drawing.

## SURVEY CONTROL CO-ORDINATES

| STATIONS | EASTINGS | NORTHINGS | LEVEL | DESCRIPTION |
|---|---|---|---|---|
| ST01 | 547610.424 | 246136.183 | 32.568 | Mag Nail |
| ST02 | 547618.594 | 246117.926 | 33.066 | Mag Nail |
| ST03 | 547633.794 | 246103.814 | 33.436 | Mag Nail |
| ST04 | 547662.319 | 246108.976 | 33.274 | Mag Nail |
| ST05 | 547673.154 | 246068.168 | 33.485 | Peg & Nail |
| ST06 | 547616.879 | 246044.259 | 34.121 | Peg & Nail |
| ST07 | 547561.776 | 246022.107 | 34.655 | Peg & Nail |
| ST08 | 547542.077 | 246080.922 | 33.700 | Mag Nail |
| ST09 | 547562.845 | 246103.943 | 33.825 | Mag Nail |
| ST10 | 547596.736 | 246114.359 | 33.478 | Mag Nail |

## SURVEY GRID AND LEVEL DATUM

The coordinate system established for this survey is related to Ordnance Survey (OS) national grid at a single point using Smartnet, then orientated to grid north with a scale factor of 1.000.

The level datum established for this survey is related to Ordnance Survey (OS) using GPS Smartnet.

To avoid discrepancies any coordinated data used in conjunction with this survey must be derived directly from this control data.

| REV | DESCRIPTION | DRAWN | APPR | DATE |
|---|---|---|---|---|

SURVEY SOLUTIONS

LAND SURVEYING
BUILDING SURVEYING
UNDERGROUND SURVEYING
SITE ENGINEERING
MONITORING

0845 040 5969
survey-solutions.co.uk

IPSWICH BRENTWOOD COVENTRY GLASGOW NORWICH NOTTINGHAM YEOVIL

| | | | | |
|---|---|---|---|---|
| PROJECT TITLE<br>DUXFORD COMMUNITY C OF E PRIMARY SCHOOL,<br>ST JOHN'S STREET, DUXFORD, CAMBRIDGE, CB22 4RA. | | | | |
| DRAWING DETAIL<br>TOPOGRAPHICAL SURVEY | | | | |
| CLIENT<br>KIER CONSTRUCTION | | | | SCALE<br>1:200 |
| SURVEYOR<br>MGC | SURVEY DATE<br>15/02/2021 | CHECKED BY<br>JIA | APPROVED BY<br>JIA | DWG STATUS<br>FINAL |
| DRAWING NUMBER<br>27841ea-01 | | | REVISION | ISSUE DATE<br>25/02/2021 |

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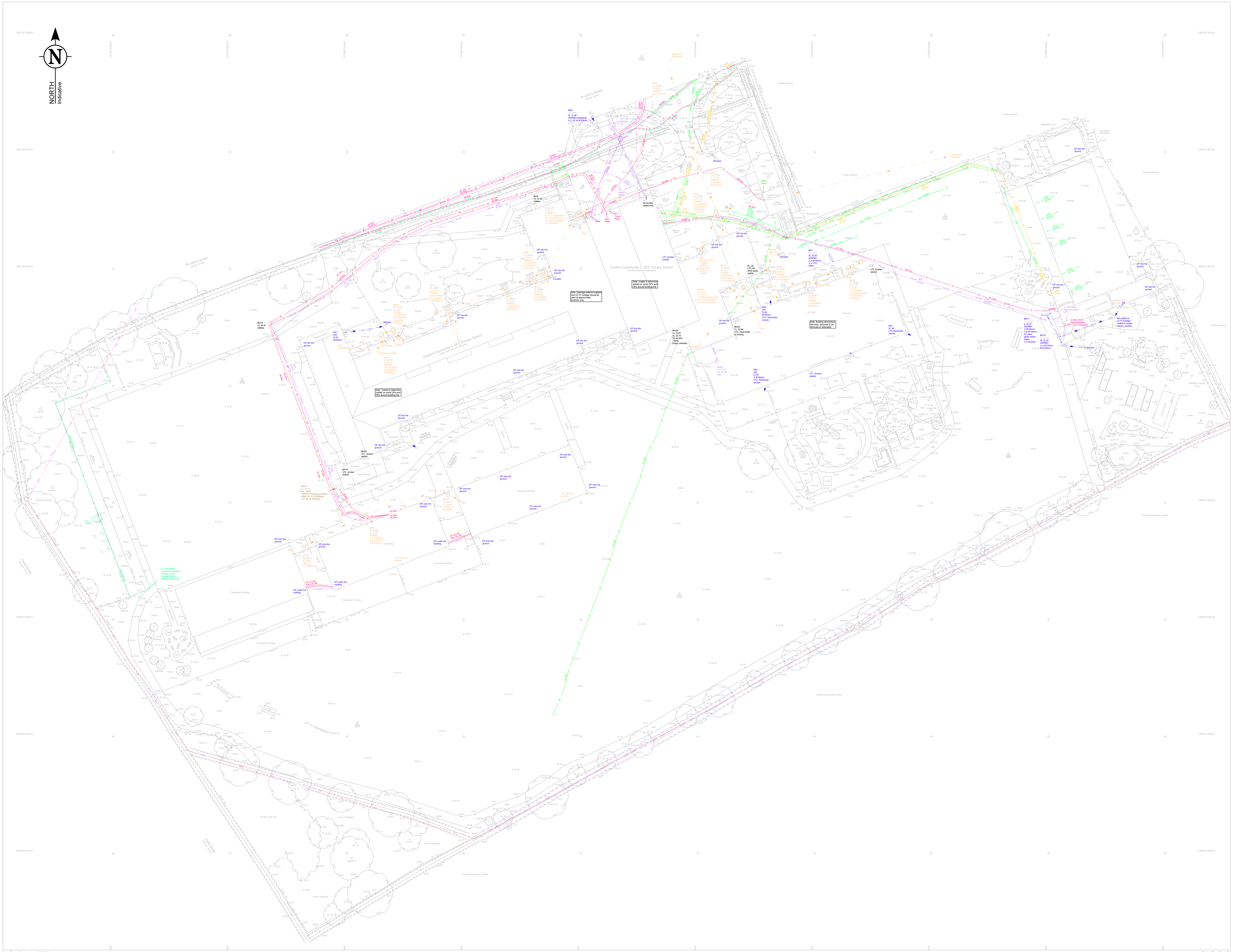


# UTILITIES & UNDERGROUND INVESTIGATIONS

## ABBREVIATIONS & SYMBOLS

| | | | | | |
|---|---|---|---|---|---|
| 1D 5C | 1 Duct 5 Cables | CUW | Camera under water | PDR | Poor depth response |
| Ø | Diameter | DCr | Depth To Crown | RB ● | Rest Bend |
| AC | Audible Connection | DI | Depth To Invert | RBC | Rectangular Brick Chamber |
| AR | Assumed Route | DS | Depth To Silt | RCC | Rectangular Conc Chamber |
| BL | Base Level | DTB | Depth To Base | SA | Survey Abandoned |
| CB | Concrete Benching | DTW | Depth To Water | SL | Silt Level |
| CBC | Circular Brick Chamber | DTS | Depth To Surcharge | SuL | Surcharge Level |
| CCC | Circular Conc Chamber | EBD | External Backdrop | TFR | Taken From Records |
| CL | Cover Level | EOT | End Of Trace | UTC | Unable To CCTV |
| CPC | Circ Plastic Chamber | IBD | Internal Backdrop | UTL | Unable To Lift |
| CrL | Crown Level | IL | Invert Level | UTT | Unable To Trace |

BT — BT CABLE(S)
O/BT — OVERHEAD BT CABLE(S)
COM — COMMUNICATIONS CABLE(S)
O/H COM — OVERHEAD COMMUNICATIONS CABLE(S)
CTV — CABLE TV CABLE(S)
DUCT — DUCT
E — ELECTRIC CABLE(S)
O/E — OVERHEAD ELECTRIC CABLE(S)
FO — FIBREOPTIC CABLE(S)
FUEL — FUEL PIPE(S)
GM — GAS MAIN
GS — GAS SERVICE
GPR — GROUND PENETRATING RADAR (GPR) TRACE
HW — HOT WATER PIPE
LC — LIGHTING CIRCUIT
OIL — OIL PIPE(S)
SCAR — VISIBLE SCARRING
SEC — SECURITY CABLING
TS — TRAFFIC SIGNAL
UIT — UNIDENTIFIED TRACE
WM — WATER MAIN
WS — WATER SERVICE
COMBINED SEWER
CW RM — COMBINED WATER RISING MAIN
EW — EFFLUENT WATER
FOUL SEWER
FW RM — FOUL WATER RISING MAIN
RISING MAIN
SURFACE WATER SEWER
SW RM — SURFACE WATER RISING MAIN
INVESTIGATION EXTENTS

Note: ....... — UTILITIES COMMENT BOX (GENERAL NOTES)
d0.37m — DEPTH TO SERVICE
??-AR — SERVICE ASSUME ROUTE
??-TFR — SERVICE TAKEN FROM RECORDS

N
NORTH
Indicative

## DRAWING NOTES

All below ground details shown have been identified from above ground without excavation. Survey Solution use electro-magnetic and/or ground penetrating radar (GPR) methods to investigate for underground utilities, services and features. Results using these methods are not infallible and we recommend trial excavations are carried out to confirm any identifications, positions and depths.

Any areas on the drawing where services or features have not been shown are not necessarily clear of services or features but are an indication that no items have been identified during our investigations. All reasonable care and normal good practice should still be employed during design and construction processes.

Certain types of services such as plastic or concrete pipes, some conduit and ducting where direct access can not be achieved for tracing may not be shown and alternative locating methods should be used.

Survey Solutions has used all reasonable care to research available service records but the completeness or use of the service records supplied to or by Survey Solutions cannot be guaranteed. Therefore Survey Solutions cannot be held responsible for any features annotated as 'taken from records' (TFR).

Depths obtained using electro-magnetic or GPR are effected by ground conditions and should be treated as indicative only. Electro-magnetic depths to utilities and services are generally taken to the centre of a feature, GPR depths to the top of a feature and drainage depth shown to inverts, unless otherwise indicated.

Drainage pipe sizes will be obtained without entering the camber and therefore should be treated as approximate. Pipe dimensions which have not been obtained visually will be taken from records when available.

All services, drainage and utilities routes are assumed straight between access points, unless otherwise stated. The numbers of cables in runs will not be shown unless specifically requested. All services are below ground unless indicated.

Services, utilities and features may not have been surveyed if obstructed or not reasonably visible or accessible at the time of survey.

Survey Solutions accept no responsibility for the completeness or accuracy of either the topographical survey or base mapping on this project.

All critical dimensions and measurements should be checked and verified with any errors or discrepancies notified to Survey Solutions immediately. The accuracy of the digital data is the same as the plotting scale implies. All dimensions are in metres unless otherwise stated.

The contractor must check and verify all site and building dimensions, levels, utilities and drainage details and connections prior to commencing work.



Do not scale from this drawing.

## AVAILABILITY OF UTILITY RECORD DRAWINGS

| UTILITY | AVAILABILITY | UTILITY | AVAILABILITY | UTILITY | AVAILABILITY |
|---|---|---|---|---|---|
| SEWER | NO | BT | PUBLIC | OIL PIPES | NO |
| WATER MAIN | NO | CABLE TV | NO | OTHERS | NO |
| GAS MAIN | PUBLIC | ELECTRICITY | NO | | |

| REV | DESCRIPTION | DRAWN | CHECKED | APPR | SURVEY DATE |
|---|---|---|---|---|---|

SURVEY SOLUTIONS

LAND SURVEYING
BUILDING SURVEYING
UNDERGROUND SURVEYING
SITE ENGINEERING
MONITORING

0845 040 5969
survey-solutions.co.uk

IPSWICH BRENTWOOD COVENTRY GLASGOW NORWICH NOTTINGHAM YEOVIL

| | | | | |
|---|---|---|---|---|
| PROJECT TITLE<br>DUXFORD PRIMARY SCHOOL.<br>CAMBRIDGE, CB22 4RA. | | | | |
| DRAWING DETAIL<br>UTILITIES AND CCTV DRAINAGE SURVEY.<br>SHEET 1 OF 1 | | | | |
| CLIENT<br>KIER. | | | | SCALE<br>1:200 |
| SURVEYOR<br>JDW/RDN | SURVEY DATE<br>25/02/2021 | CHECKED BY<br>BCC | APPROVED BY<br>RAG | DWG STATUS<br>FINAL |
| DRAWING NUMBER<br>27841UG-01 | | | REVISION | ISSUE DATE<br>11/03/2021 |

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Original Sheet Size A0H

**APPENDIX C – BRE 365 TESTING RESULTS**

# Soakaway Test Results

| PROJECT NAME | PROJECT MANAGER | DATE | |
|---|---|---|---|
| Duxford Primary School | Lindsay McGinnigle | 02.06.21 | |
| PROJECT NUMBER | AUTHOR | Test Location/Number | |
| 65202745 | Tom Creighton | BRE01 | 1 |

Readings:

| Time (mins) | Water Level (m bgl) |
|---|---|
| 0 | 1.05 |
| 1 | 1.40 |
| 2 | 1.49 |
| 3 | 1.58 |
| 4 | 1.66 |
| 5 | 1.72 |
| 6 | 1.78 |
| 7 | 1.82 |
| 8 | 1.84 |
| 9 | 1.87 |
| 10 | 1.91 |

Trial Pit Dimensions (m)

| | |
|---|---|
| Length | 1.40 |
| Width | 0.45 |
| Depth | 2.00 |

| | |
|---|---|
| Assumed Invert Level (m bgl) | 1.05 |

| | |
|---|---|
| Was trial pit filled with gravel (Yes/No): | Yes |

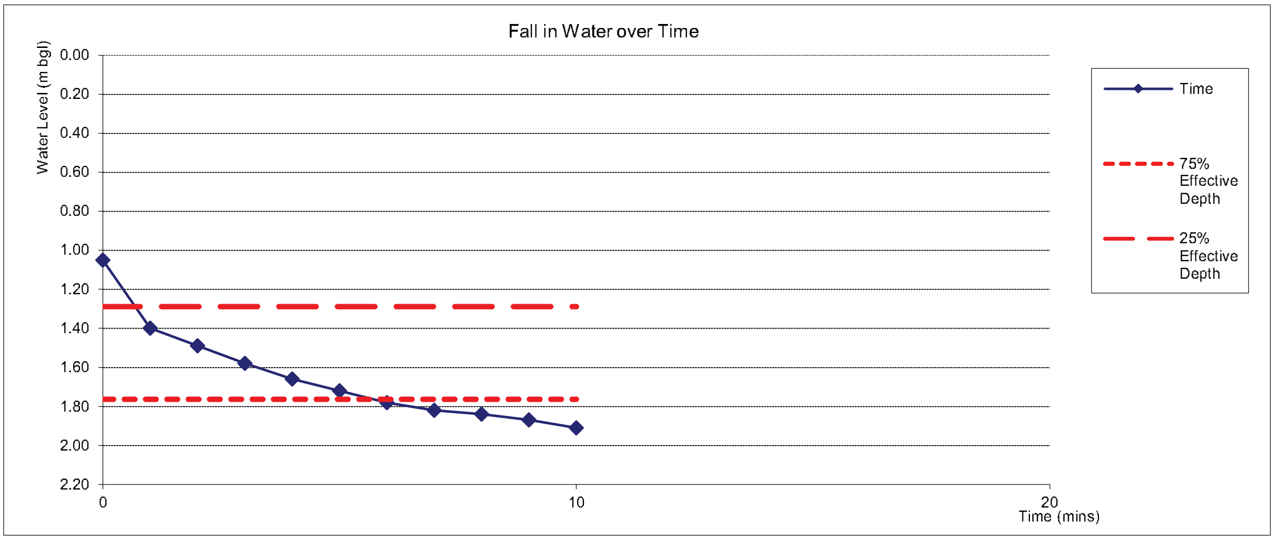
| | |
|---|---|
| Assumed fill porosity (CIRIA 156) | 40% |

Ground Conditions:

| | |
|---|---|
| | Refer to engineers logs |

Notes

1. The soil infiltration rate has been calculated using the BRESOAK Program version 1.0.4




Soil Infiltration Rate (m/sec) $f$ $\dfrac{V_{p75-25}}{a_{p50} \times t_{p75-25}}$

Soil Infiltration Rate (m/sec) $f$ **$1.74 \times 10^{-04}$**

# Soakaway Test Results

| PROJECT NAME | PROJECT MANAGER | DATE | |
|---|---|---|---|
| Duxford Primary School | Lindsay McGinnigle | 02.06.21 | |
| PROJECT NUMBER | AUTHOR | Test Location/Number | |
| 65202745 | Tom Creighton | BRE01 | 2 |

Readings:

| Time (mins) | Water Level (m bgl) |
|---|---|
| 0 | 1.00 |
| 1 | 1.38 |
| 2 | 1.47 |
| 3 | 1.55 |
| 4 | 1.65 |
| 5 | 1.68 |
| 6 | 1.74 |
| 7 | 1.78 |
| 8 | 1.83 |
| 9 | 1.86 |
| 11 | 1.92 |

Trial Pit Dimensions (m)

| | |
|---|---|
| Length | 1.40 |
| Width | 0.45 |
| Depth | 2.00 |

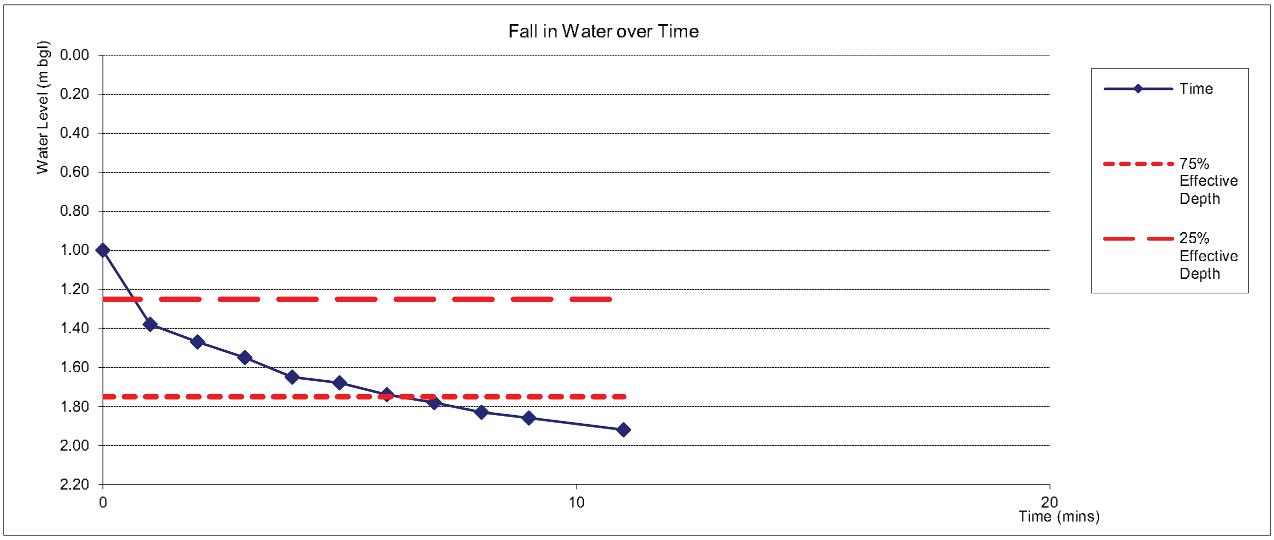
| | |
|---|---|
| Assumed Invert Level (m bgl) | 1 |
| Was trial pit filled with gravel (Yes/No): | Yes |
| Assumed fill porosity (CIRIA 156) | 40% |

Ground Conditions:

| | |
|---|---|
| | Refer to engineers logs |

Notes

1. The soil infiltration rate has been calculated using the BRESOAK Program version 1.0.4




Soil Infiltration Rate (m/sec) $f$ $\dfrac{V_{p75-25}}{\alpha_{p50} \times t_{p75-25}}$

Soil Infiltration Rate (m/sec) $f$ **$1.53 \times 10^{-04}$**

SWECO

# Soakaway Test Results

| PROJECT NAME | PROJECT MANAGER | DATE | |
|---|---|---|---|
| Duxford Primary School | Lindsay McGinnigle | 02.06.21 | |
| PROJECT NUMBER | AUTHOR | Test Location/Number | |
| 65202745 | Tom Creighton | BRE01 | 3 |

Readings:

| Time (mins) | Water Level (m bgl) |
|---|---|
| 0 | 1.00 |
| 1 | 1.35 |
| 2 | 1.42 |
| 3 | 1.50 |
| 4 | 1.56 |
| 5 | 1.63 |
| 6 | 1.69 |
| 8 | 1.79 |
| 10 | 1.86 |
| 12 | 1.91 |
| 14 | 1.99 |
| | |
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| | |

Trial Pit Dimensions (m)

| | |
|---|---|
| Length | 1.40 |
| Width | 0.45 |
| Depth | 2.00 |

| | |
|---|---|
| Assumed Invert Level (m bgl) | 1 |

| | |
|---|---|
| Was trial pit filled with gravel (Yes/No): | Yes |

| | |
|---|---|
| Assumed fill porosity (CIRIA 156) | 40% |

Ground Conditions:

| | |
|---|---|
| | Refer to engineers logs |
| | |
| | |
| | |
| | |

Notes

| |
|---|
| 1. The soil infiltration rate has been calculated using the BRESOAK Program version 1.0.4 |
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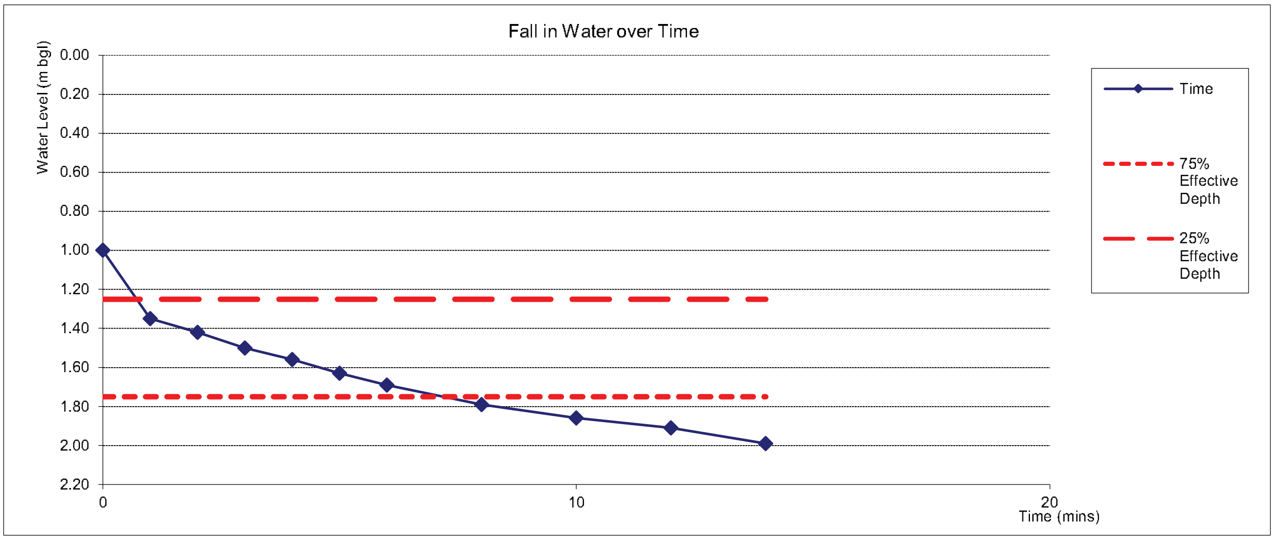
| |




Soil Infiltration Rate (m/sec) $f$ $$\frac{V_{p75-25}}{\alpha_{p50} \times t_{p75-25}}$$

Soil Infiltration Rate (m/sec) $f$ **$1.32 \times 10^{-04}$**