



## DRAINAGE STRATEGY

LAND TO THE WEST OF NURSERY MEWS

HELIX HOMES PARTNERSHIP

AUGUST 2024

5824-MEWS-ICS-XX-RP-C-07.001-P03

# DRAINAGE STRATEGY

5824-MEWS-ICS-XX-RP-C-07.001-P03

## REPORT ISSUE

| Revision | Date       | Notes                        |
|----------|------------|------------------------------|
| P01      | 29/08/2024 | First Issue                  |
| P02      | 29/08/2024 | Updated from client comments |
| P03      | 23/10/2024 | Layout Updates               |

## PREPARED BY

B. KNOWLDEN August 2024

## REVIEWED BY

A. J. GRIFFITHS August 2024

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## 1 DRAINAGE STRATEGY

| Item                                     | Details                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | Reference<br>/comment                                                              |
|------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------|
| <b>Method of Foul Water Discharge</b>    | Foul water flows are to drain to the existing manhole outside the site boundary to the west of the site via gravity, subject to Southern Water's confirmation of section 106. The main drainage run is also going to be offered for adoption under a section 104 agreement.                                                                                                                                                                                                                                                                                                                                                                                                                                                     | The new connection will be subject to S106 connection consent from Southern Water. |
| <b>Method of Surface Water Discharge</b> | <p>The surface water drainage design proposed for the new dwellings is to follow the drainage hierarchy to ensure the site reflects the natural flows from the site as closely as possible:</p> <ol style="list-style-type: none"> <li>1. Rainwater reuse</li> <li>2. Infiltration</li> <li>3. Discharge to Surface Water or a Watercourse</li> <li>4. Discharge to a Surface Water sewer or a Highway Drain</li> <li>5. Discharge to a Foul Sewer</li> </ol> <p>Surface water falling onto the roof and hardstanding areas will be drained via infiltration using modular/crate soakaways. The soakaway has been sized to manage the surface water from the roofs, car parking areas as well as the emergency access road.</p> |                                                                                    |
| <b>Local Ground Conditions</b>           | A Site Investigation Report (Ref: 24-02-12, Dated August 2024) has been undertaken on site by Geo Integrity which found the site to be underlain by Low-Medium Density Chalks. This means the soakaway will need to be 10m away from any structures.                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |                                                                                    |
| <b>Infiltration Rate</b>                 | A Site Investigation Report (Ref: 24-02-12, Dated August 2024) has been undertaken on site by Low-Medium Density Chalks and found the site-specific infiltration rate to be $1.05 \times 10^{-3}$ m/s.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | The Infiltration Rate used for the design is $1.05 \times 10^{-3}$ m/s.            |
| <b>Surface Water Calculations</b>        | <p>The surface water drainage system has been designed for a 1 in 100-year event, plus an allowance of 40% for climate change.</p> <p>The roof run off areas have had an additional 10% added for urban creep in line with Ciria C753. Road areas have not had urban creep applied to them. Contributing Areas</p> <p>Roof Areas = 266m<sup>2</sup> with urban creep = 292m<sup>2</sup></p> <p>Road Area = 200m<sup>2</sup></p> <p>Parking Area = 205m<sup>2</sup></p> <p>Total Area = 700m<sup>2</sup></p>                                                                                                                                                                                                                     | The total impermeable area for the site is 700m <sup>2</sup>                       |

| Item                                                            | Details                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | Reference<br>/comment                                           |
|-----------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------|
| <b>Ground Water</b>                                             | The site investigation report confirmed that the natural water table was not encountered at a depth of 1.8m in trial holes CBR101.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |                                                                 |
| <b>Water Quality</b>                                            | Permeable paving will be required for its water purification qualities in order to avoid the need for petrol interceptors.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |                                                                 |
| <b>Exceedance Flows</b>                                         | <p>It is proposed that finished floor levels will be raised 150mm above the average ground level to mitigate against the risk of any surface water flooding.</p> <p>Exceedance flows will replicate the existing and flow at a surface level from the lowest point on the surface water system towards the public highway.</p> <p>The proposed surface water drainage measures will be designed to contain the peak storm event that can be expected for a 1 in 100-year situation. A 40% allowance has already been applied to the site to account for future climate change and a further 10% added to the impermeable areas to allow for urban creep.</p> |                                                                 |
| <b>Fluvial Flood Risk/<br/>Environment Agency Flood Mapping</b> | The Environment Agency flood map for the development site suggests that the site wholly falls within Flood zone 1, which is defined as land assessed as having a less than 1 in 1000 annual probability of river flooding in any one year. `                                                                                                                                                                                                                                                                                                                                                                                                                 |                                                                 |
| <b>SuDS Maintenance</b>                                         | During construction, the SuDS systems will be maintained by the contractor. Upon sale of the last plot, the SuDS drainage system inclusive of access road, permeable paving and silt traps are to be maintained by the owner of the freehold or their appointed representative(s).                                                                                                                                                                                                                                                                                                                                                                           | Refer to Appendix A for the suggested SuDS Maintenance schedule |
| <b>Other</b>                                                    |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |                                                                 |

Table 1 Drainage Strategy

## Appendix A - Maintenance Schedule

| Item                                                 | Required Maintenance                                                                                                                                                                 | Frequency                              |
|------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------|
| <b>Pipe and chambers</b>                             | CCTV camera survey, flush, descale, repair as necessary                                                                                                                              | 5 Years or upon poor performance       |
| <b>Geocellular/<br/>modular systems<br/>(Crates)</b> | Inspect and identify any areas that are not operating correctly. If required, take remedial action.                                                                                  | Monthly for 3 months, then six monthly |
|                                                      | Debris removal from catchment surface (where may cause risks to performance)                                                                                                         | Monthly                                |
|                                                      | Where rainfall infiltrates into blocks from above, check surface of filter for blockage by silt, algae or other matter. Remove and replace surface infiltration medium as necessary. | Monthly (and after large storms)       |
|                                                      | Remove sediment from pre-treatment structures                                                                                                                                        | Annually, or as required               |
|                                                      | Repair/rehabilitation of inlets, outlet, overflows and vents                                                                                                                         | As required                            |
|                                                      | Inspect/check all inlets, outlets, vents and overflows to ensure that they are in good condition and operating as designed                                                           | Annually and after large storms        |
| <b>Silt traps and catchpits</b>                      | Inspect and identify any areas that are not operating correctly. If required, take remedial action.                                                                                  | Monthly for 3 months, then six monthly |
|                                                      | Debris removal from catchment surface (where may cause risks to performance)                                                                                                         | Monthly                                |
|                                                      | Inspection of silt traps and catch pits to assess silt accumulation                                                                                                                  | Monthly (and after large storms)       |
|                                                      | Removal of accumulated silt from silt trap and catch pit sumps                                                                                                                       | Annually, or as required               |
|                                                      | Repair/rehabilitation of inlets, outlet, overflows and vents                                                                                                                         | As required                            |
|                                                      | Inspect/check all inlets, outlets, and overflows to ensure that they are in good condition and operating as designed                                                                 | Annually and after large storms        |

Table 2 SuDS Maintenance

## **Appendix B - Infiltration Testing and Geotechnical report**



|                                                                                                                        |                                                                                                                    |                                                                    |                                                          |
|------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------|----------------------------------------------------------|
| <b>Key</b><br>Continuous Tube Borehole & DPSH<br>BRE365 Soakaway Test<br>Plate Load CBR Test & Trial Pit<br>Hand Auger | <b>Exploratory Hole Location Plan</b>                                                                              | <b>SITE:</b> Land to the west of Nursery Mews, Gravesend, DA11 7BU | <b>Drawn</b><br>HF                                       |
|                                                                                                                        | <b>JOB NO.:</b> 24-06-12                                                                                           | <b>CLIENT:</b> Helix Partnership Homes Ltd                         | <b>Checked</b><br>FW                                     |
|                                                                                                                        | Tel:- 01280 816409<br>Mob:- 07858 367 125<br><a href="http://www.geo-integrity.co.uk">www. geo-integrity.co.uk</a> | 4 Church Street<br>Maids Moreton<br>MK18 1QE                       | <b>Scale:</b> Not To Scale, for indicative purposes only |





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# Site

Land off Nursery Mews, Gravesend, Kent, DA12 5JT

Number  
CT1

Machine : Window Sampling Rig

Method : Drive-in Windowless  
Sampler

## Dimensions

87mm to 2.00m 57mm to 5.00m  
77mm to 3.00m  
67mm to 4.00m

## Ground Level (mOD)

## Client

Helix Partnership Homes Ltd

Job  
Number  
24-06-12

## Location (Handheld GPS)

565155 E 171450 N

## Dates

02/07/2024

## Project Contractor

Geo-Integrity

Sheet  
1/1

| Depth<br>(m)           | Sample / Tests | Water<br>Depth<br>(m) | Field Records          | Level<br>(mOD) | Depth<br>(m)<br>(Thickness) | Description                                                                                                                                                                                                                                                                                   | Legend | Water | Instr |
|------------------------|----------------|-----------------------|------------------------|----------------|-----------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------|-------|-------|
| 0.10-0.30              | D              |                       |                        |                | (0.10)<br>0.10              | MADE GROUND - Tarmac                                                                                                                                                                                                                                                                          |        |       |       |
| 0.30-0.50              | D              |                       |                        |                | (0.20)<br>0.30              | MADE GROUND - Stiff dark brown and brown silty<br>sandy gravelly CLAY with flint cobbles. Gravel is<br>fine to coarse angular to subrounded of flint                                                                                                                                          |        |       |       |
| 0.50-1.00              | D              |                       |                        |                | (0.20)<br>0.50              | SUPERFICIAL DEPOSITS - Medium dense light<br>brown, orangish brown and white very gravelly<br>slightly clayey fine SAND with flint cobbles. Gravel<br>is fine to coarse angular of chalk                                                                                                      |        |       |       |
| 1.00-1.45<br>1.00-1.50 | SPT N=19<br>D  |                       | 4,3/4,5,5,5            |                |                             | LEWES NODULAR, SEAFORD AND NEWHAVEN<br>CHALK FORMATIONS (UNDIFFERENTIATED) -<br>Structureless CHALK composed of slightly silty<br>medium to coarse angular GRAVEL. Clasts are<br>low to medium density, white and cream with<br>occasional black specks, with occasional flint.<br>(Grade Dc) |        |       |       |
| 1.50-2.00              | D              |                       |                        |                | (2.00)                      |                                                                                                                                                                                                                                                                                               |        |       |       |
| 2.00-2.45<br>2.00-2.50 | SPT N=20<br>D  |                       | 5,5/5,5,4,6            |                |                             |                                                                                                                                                                                                                                                                                               |        |       |       |
| 2.50-3.00              | D              |                       |                        |                | 2.50                        | LEWES NODULAR, SEAFORD AND NEWHAVEN<br>CHALK FORMATIONS (UNDIFFERENTIATED) -<br>Structureless CHALK composed of white and<br>cream occasionally gravelly SILT. Gravel is<br>medium low density chalk. (Grade Dm)                                                                              |        |       |       |
| 3.00-3.45<br>3.00-3.50 | SPT N=29<br>D  |                       | 6,5/7,7,7,8            |                |                             |                                                                                                                                                                                                                                                                                               |        |       |       |
| 3.50-4.00              | D              |                       |                        |                | (2.50)                      |                                                                                                                                                                                                                                                                                               |        |       |       |
| 4.00-4.45<br>4.00-4.50 | SPT N=34<br>D  |                       | 9,8/8,9,8,9            |                |                             |                                                                                                                                                                                                                                                                                               |        |       |       |
| 4.50-5.00              | D              |                       |                        |                |                             |                                                                                                                                                                                                                                                                                               |        |       |       |
|                        |                |                       | Continued with DPSH P1 |                | 5.00                        |                                                                                                                                                                                                                                                                                               |        |       |       |

## Remarks

Scale  
(approx)

1:25

Logged  
By

FW

Figure No.

24-06-12.CT1





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**Site**

Land off Nursery Mews, Gravesend, Kent, DA12 5JT

**Number**  
**CT2**

**Machine :** Window Sampling Rig

**Method :** Drive-in Windowless Sampler

**Dimensions**

87mm to 2.00m 57mm to 5.00m  
77mm to 3.00m  
67mm to 4.00m

**Ground Level (mOD)****Client**

Helix Partnership Homes Ltd

**Job**  
**Number**  
24-06-12

**Location (Handheld GPS)**

565167 E 171443 N

**Dates**

02/07/2024

**Project Contractor**

Geo-Integrity

**Sheet**  
1/1

| Depth (m)              | Sample / Tests | Water Depth (m) | Field Records           | Level (mOD) | Depth (m) (Thickness) | Description                                                                                                                                                                                                                                                                 | Legend | Water |
|------------------------|----------------|-----------------|-------------------------|-------------|-----------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------|-------|
| 0.10-0.40              | D              |                 |                         |             | (0.10)<br>0.10        | MADE GROUND - Tarmac                                                                                                                                                                                                                                                        |        |       |
| 0.40-1.00              | D              |                 |                         |             | (0.30)<br>0.40        | MADE GROUND - Stiff dark brown and brown silty sandy gravelly CLAY with flint cobbles. Gravel is fine to coarse angular to sub-rounded of flint                                                                                                                             |        |       |
| 1.00-1.45<br>1.00-1.50 | SPT N=20<br>D  | 4,4/4,5,5,6     |                         |             |                       | LEWES NODULAR, SEAFORD AND NEWHAVEN CHALK FORMATIONS (UNDIFFERENTIATED) - Structureless CHALK composed of slightly silty medium to coarse angular GRAVEL. Clasts are low to medium density, white and cream with occasional black specks, with occasional flint. (Grade Dc) |        |       |
| 1.50-2.00              | D              |                 |                         |             | (2.60)                |                                                                                                                                                                                                                                                                             |        |       |
| 2.00-2.45<br>2.00-2.50 | SPT N=23<br>D  | 7,7/6,5,6,6     |                         |             |                       |                                                                                                                                                                                                                                                                             |        |       |
| 2.50-3.00              | D              |                 |                         |             |                       |                                                                                                                                                                                                                                                                             |        |       |
| 3.00-3.45<br>3.00-3.50 | SPT N=27<br>D  | 6,5/7,7,6,7     |                         |             | 3.00                  | LEWES NODULAR, SEAFORD AND NEWHAVEN CHALK FORMATIONS (UNDIFFERENTIATED) - Structureless CHALK composed of white and cream occasionally gravelly SILT. Gravel is medium low density chalk. (Grade Dm)                                                                        |        |       |
| 3.50-4.00              | D              |                 |                         |             |                       |                                                                                                                                                                                                                                                                             |        |       |
| 4.00-4.45<br>4.00-4.50 | SPT N=35<br>D  | 9,8/9,8,9,9     |                         |             | (2.00)                |                                                                                                                                                                                                                                                                             |        |       |
| 4.50-5.00              | D              |                 |                         |             |                       |                                                                                                                                                                                                                                                                             |        |       |
|                        |                |                 | Continued with DPSH P2. |             | 5.00                  |                                                                                                                                                                                                                                                                             |        |       |

**Remarks**

**Scale (approx)**

1:25

**Logged By**

FW

**Figure No.**

24-06-12.CT2





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**Site**

Land off Nursery Mews, Gravesend, Kent, DA12 5JT

**Number**  
**CT3**

**Machine :** Window Sampling Rig

**Method :** Drive-in Windowless Sampler

**Dimensions**

87mm to 2.00m 57mm to 5.00m  
77mm to 3.00m  
67mm to 4.00m

**Ground Level (mOD)****Client**

Helix Partnership Homes Ltd

**Job**  
**Number**  
24-06-12

**Location (Handheld GPS)**

565141 E 171446 N

**Dates**

02/07/2024

**Project Contractor**

Geo-Integrity

**Sheet**  
1/1

| Depth (m)              | Sample / Tests | Water Depth (m) | Field Records           | Level (mOD) | Depth (m) (Thickness) | Description                                                                                                                                                                                                                                                                 | Legend | Water |
|------------------------|----------------|-----------------|-------------------------|-------------|-----------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------|-------|
| 0.10-0.70              | D              |                 |                         |             | (0.70)                | SUPERFICIAL DEPOSITS - Stiff orange-brown gravelly CLAY. Gravel is medium to coarse flint and chalk                                                                                                                                                                         |        |       |
| 0.70-1.00              | D              |                 |                         |             | 0.70                  |                                                                                                                                                                                                                                                                             |        |       |
| 1.00-1.45<br>1.00-1.50 | SPT N=14<br>D  |                 | 3,3/4,3,3,4             |             | (1.30)                | LEWES NODULAR, SEAFORD AND NEWHAVEN CHALK FORMATIONS (UNDIFFERENTIATED) - Structureless CHALK composed of slightly silty medium to coarse angular GRAVEL. Clasts are low to medium density, white and cream with occasional black specks, with occasional flint. (Grade Dc) |        |       |
| 1.50-2.00              | D              |                 |                         |             |                       |                                                                                                                                                                                                                                                                             |        |       |
| 2.00-2.45<br>2.00-2.50 | SPT N=20<br>D  |                 | 5,5/5,5,5,5             |             | 2.00                  | LEWES NODULAR, SEAFORD AND NEWHAVEN CHALK FORMATIONS (UNDIFFERENTIATED) - Structureless CHALK composed of white and cream occasionally gravelly SILT. Gravel is medium low density chalk. (Grade Dm)                                                                        |        |       |
| 2.50-3.00              | D              |                 |                         |             |                       |                                                                                                                                                                                                                                                                             |        |       |
| 3.00-3.45<br>3.00-3.50 | SPT N=27<br>D  |                 | 8,8/6,7,6,8             |             |                       |                                                                                                                                                                                                                                                                             |        |       |
| 3.50-4.00              | D              |                 |                         |             | (3.00)                |                                                                                                                                                                                                                                                                             |        |       |
| 4.00-4.45<br>4.00-4.50 | SPT N=25<br>D  |                 | 3,3/5,5,7,8             |             |                       |                                                                                                                                                                                                                                                                             |        |       |
| 4.50-5.00              | D              |                 |                         |             |                       |                                                                                                                                                                                                                                                                             |        |       |
|                        |                |                 | Continued with DPSH P3. |             | 5.00                  |                                                                                                                                                                                                                                                                             |        |       |

**Remarks**

**Scale (approx)**

1:25

**Logged By**

FW

**Figure No.**

24-06-12.CT3

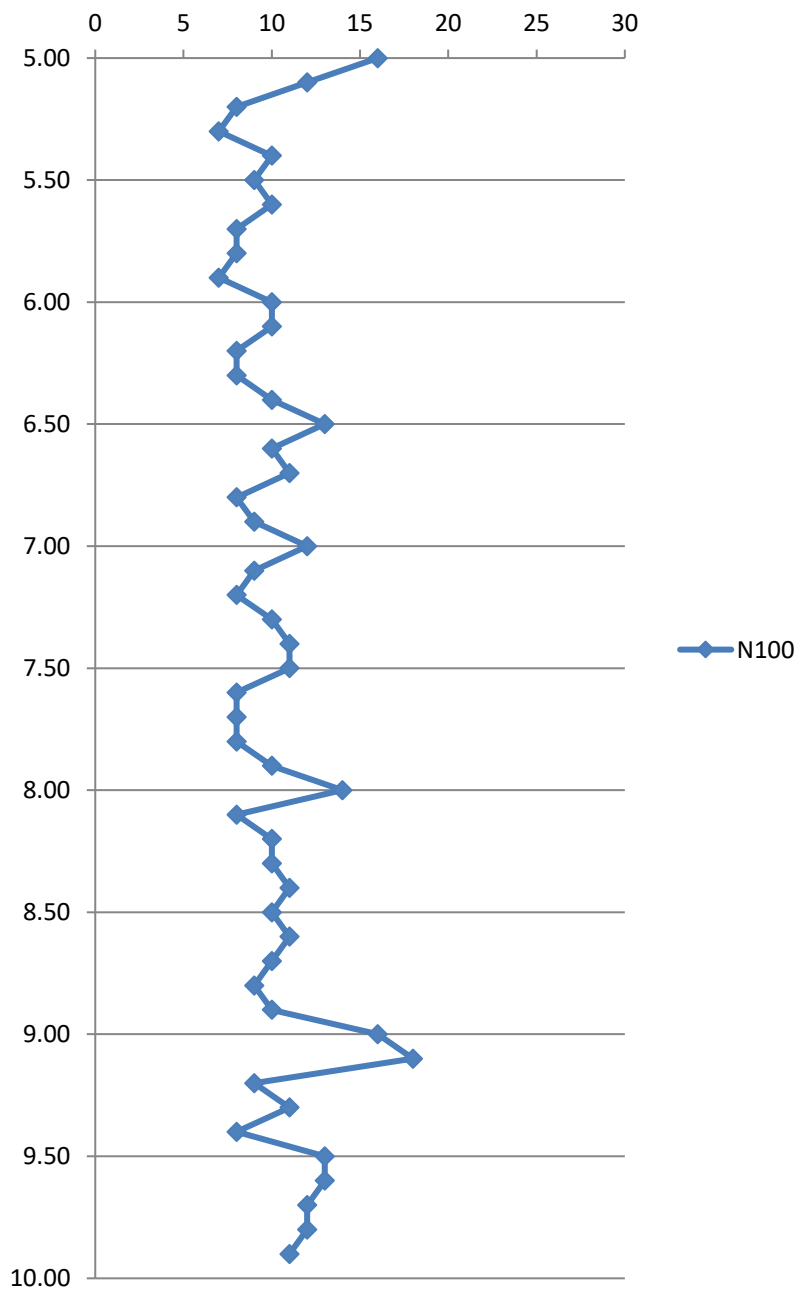




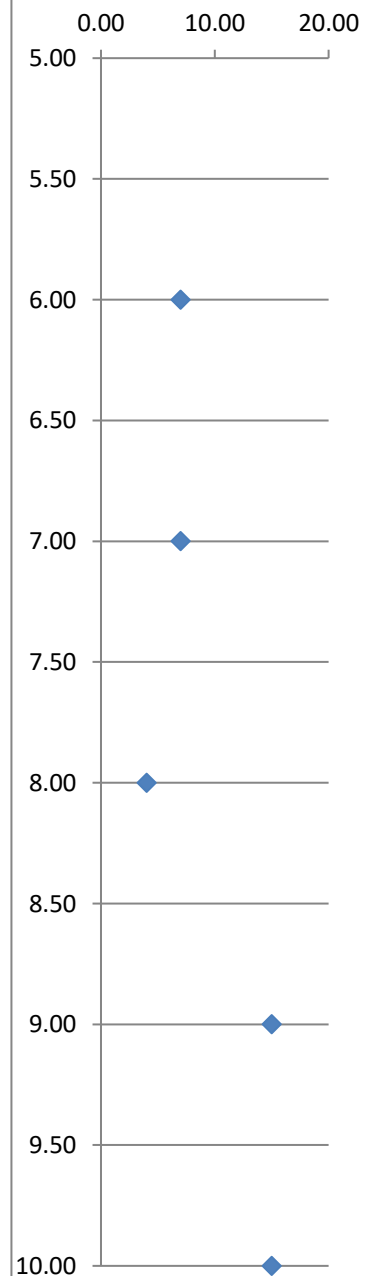
## SUPER HEAVY DYNAMIC PROBE - P1

|                |                                 |               |        |
|----------------|---------------------------------|---------------|--------|
| PROJECT NUMBER | 24-06-12                        | HAMMER WEIGHT | 63.5KG |
| PROJECT NAME   | Nursery Mews, Gravesend         | HAMMER DROP   | 0.76m  |
| CLIENT         | Helix Partnership Homes Limited |               |        |
| DRILLING DATE  | 02/07/2024                      |               |        |

### N100



### Torque



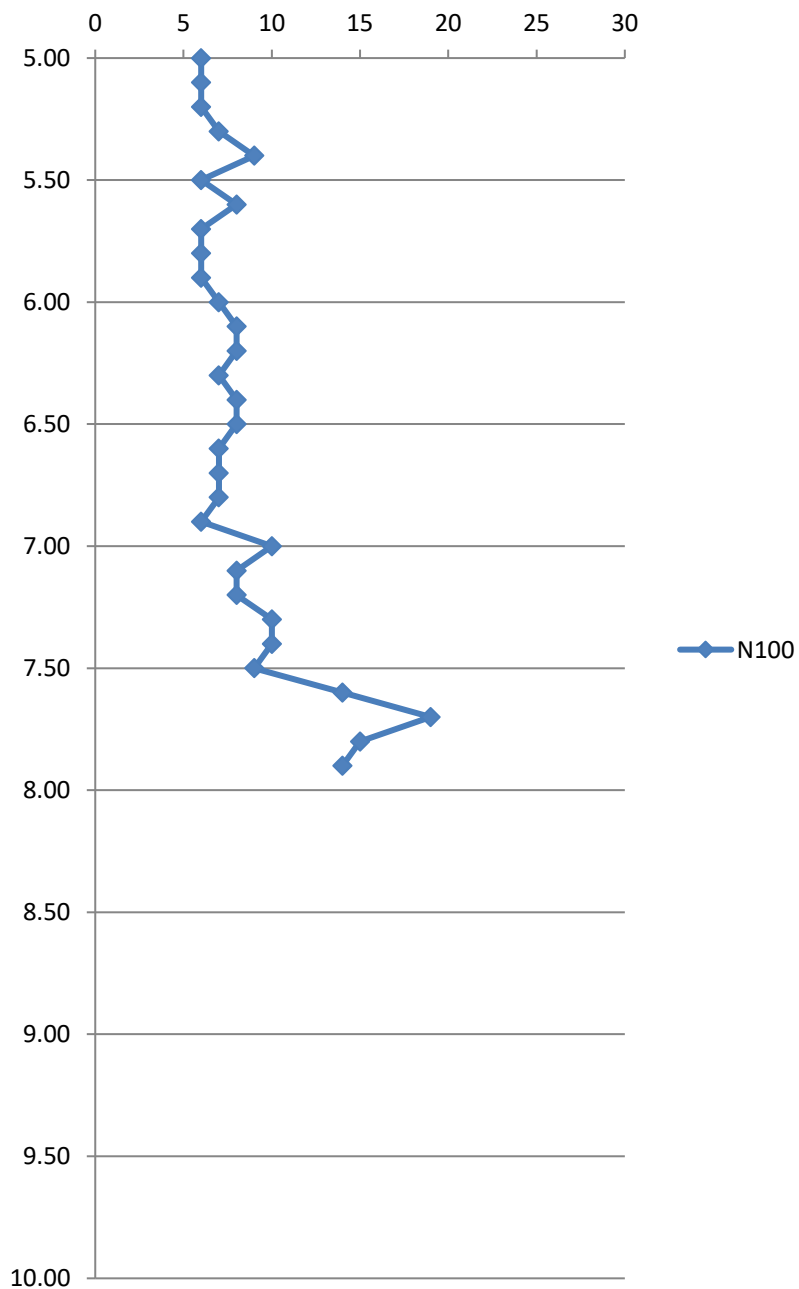
INTERPRETED GROUND CONDITIONS:-



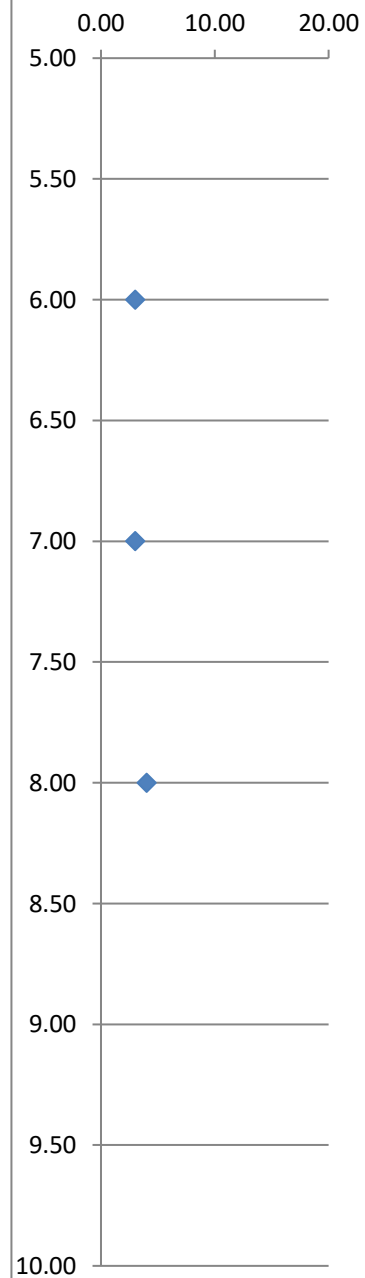
## SUPER HEAVY DYNAMIC PROBE - P2

|                |                                 |               |        |
|----------------|---------------------------------|---------------|--------|
| PROJECT NUMBER | 24-06-12                        | HAMMER WEIGHT | 63.5KG |
| PROJECT NAME   | Nursery Mews, Gravesend         | HAMMER DROP   | 0.76m  |
| CLIENT         | Helix Partnership Homes Limited |               |        |
| DRILLING DATE  | 02/07/2024                      |               |        |

### N100



### Torque



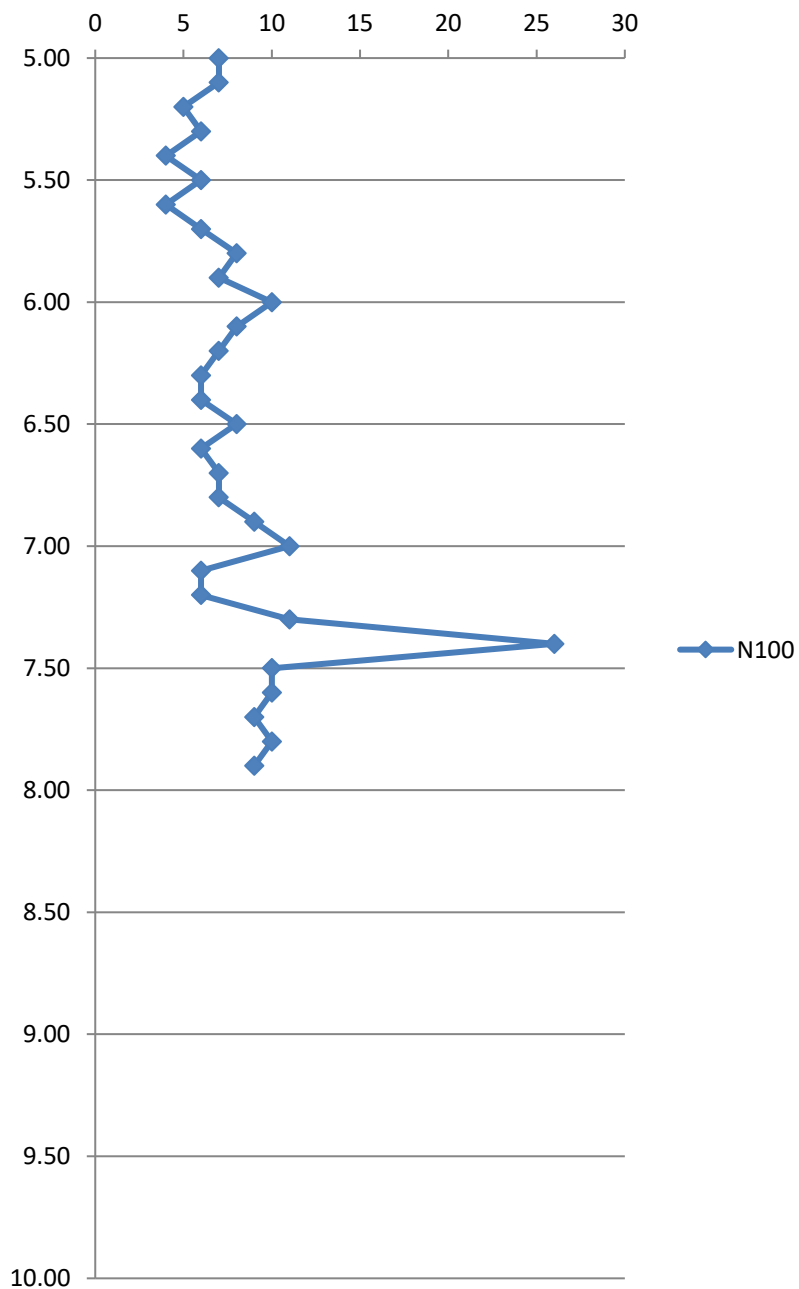
INTERPRETED GROUND CONDITIONS:-



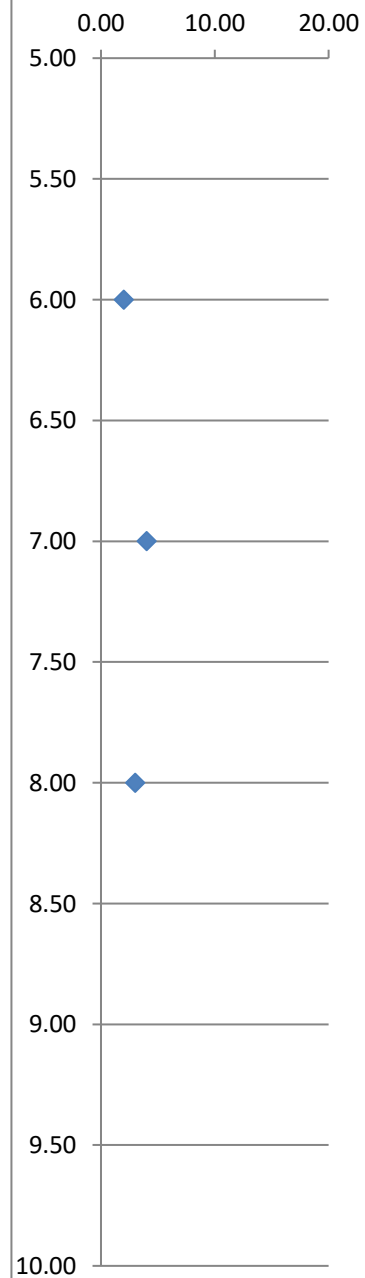
## SUPER HEAVY DYNAMIC PROBE - P3

|                |                                 |               |        |
|----------------|---------------------------------|---------------|--------|
| PROJECT NUMBER | 24-06-12                        | HAMMER WEIGHT | 63.5KG |
| PROJECT NAME   | Nursery Mews, Gravesend         | HAMMER DROP   | 0.76m  |
| CLIENT         | Helix Partnership Homes Limited |               |        |
| DRILLING DATE  | 02/07/2024                      |               |        |

### N100



### Torque



INTERPRETED GROUND CONDITIONS:-



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Site  
Land off Nursery Mews, Gravesend, Kent, DA12 5JT

Trial Pit Number  
**CBR101**

|                                         |  |                                              |  |                     |  |                                       |  |                        |  |
|-----------------------------------------|--|----------------------------------------------|--|---------------------|--|---------------------------------------|--|------------------------|--|
| Machine : JCB 3CX<br>Method : Trial Pit |  | Dimensions                                   |  | Ground Level (mOD)  |  | Client<br>Helix Partnership Homes Ltd |  | Job Number<br>24-06-12 |  |
|                                         |  | Location (Handheld GPS)<br>565155 E 171434 N |  | Dates<br>02/07/2024 |  | Project Contractor<br>Geo-Integrity   |  | Sheet<br>1/1           |  |

| Depth (m) | Sample / Tests | Water Depth (m) | Field Records | Level (mOD) | Depth (m) (Thickness) | Description                                                                                                                                                                                                                                                                            | Legend | Water |
|-----------|----------------|-----------------|---------------|-------------|-----------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------|-------|
| 0.00      | D              |                 |               |             |                       | MADE GROUND - Tarmac over loose brown gravelly SAND. Gravel is fine to coarse flint, quartzite and tarmac                                                                                                                                                                              |        |       |
| 0.20      | D              |                 |               |             | (0.30)                |                                                                                                                                                                                                                                                                                        |        |       |
|           |                |                 |               |             | 0.30                  |                                                                                                                                                                                                                                                                                        |        |       |
| 0.50      | D              |                 |               |             | (0.50)                | SUPERFICIAL DEPOSITS - (Loose to medium dense) brown very gravelly silty dry CLAY. Gravel is fine to coarse chalk and flint                                                                                                                                                            |        |       |
|           |                |                 |               |             | 0.80                  |                                                                                                                                                                                                                                                                                        |        |       |
|           |                |                 |               |             | (1.00)                | LEWES NODULAR, SEAFORD AND NEWHAVEN CHALK FORMATIONS (UNDIFFERENTIATED) - Structureless CHALK composed of fine to coarse GRAVEL AND COBBLES of cream and white chalk and rare flint. Chalk is low to medium density with occasional black specks. (Grade Dc) Becoming white from 1.10m |        |       |
| 1.50      | D              |                 |               |             | 1.80                  | Complete at 1.80m                                                                                                                                                                                                                                                                      |        |       |

|      |   |   |   |   |                |           |                 |  |
|------|---|---|---|---|----------------|-----------|-----------------|--|
| Plan |   |   |   |   | Remarks        |           |                 |  |
| .    | . | . | . | . |                |           |                 |  |
| .    | . | . | . | . |                |           |                 |  |
| .    | . | . | . | . |                |           |                 |  |
| .    | . | . | . | . |                |           |                 |  |
| .    | . | . | . | . |                |           |                 |  |
| .    | . | . | . | . |                |           |                 |  |
|      |   |   |   |   | Scale (approx) | Logged By | Figure No.      |  |
|      |   |   |   |   | 1:25           | FW        | 24-06-12.CBR101 |  |



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Site  
Land off Nursery Mews, Gravesend, Kent, DA12 5JT  
Trial Pit Number  
**CBR102**

|                                         |  |                                              |  |                     |  |                                       |  |                        |  |
|-----------------------------------------|--|----------------------------------------------|--|---------------------|--|---------------------------------------|--|------------------------|--|
| Machine : JCB 3CX<br>Method : Trial Pit |  | Dimensions                                   |  | Ground Level (mOD)  |  | Client<br>Helix Partnership Homes Ltd |  | Job Number<br>24-06-12 |  |
|                                         |  | Location (Handheld GPS)<br>565171 E 171453 N |  | Dates<br>02/07/2024 |  | Project Contractor<br>Geo-Integrity   |  | Sheet<br>1/1           |  |

| Depth (m) | Sample / Tests | Water Depth (m) | Field Records | Level (mOD) | Depth (m) (Thickness) | Description                                                                                                                                                                                                                                             | Legend | Water |
|-----------|----------------|-----------------|---------------|-------------|-----------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------|-------|
| 0.10      | D              |                 |               |             | (0.20)<br>0.20        | MADE GROUND - Tarmac over (medium dense) brown gravelly SAND. Gravel is medium to coarse flint, quartzite, tarmac and brick                                                                                                                             |        |       |
| 0.40      | D              |                 |               |             | (0.50)<br>0.70        | SUPERFICIAL DEPOSITS - (Loose to medium dense) grey brown very gravelly silty dry CLAY. Gravel is fine to coarse chalk and flint, with frequent flint boulders                                                                                          |        |       |
| 1.30      | D              |                 |               |             | (1.00)<br>1.70        | LEWES NODULAR, SEAFORD AND NEWHAVEN CHALK FORMATIONS (UNDIFFERENTIATED) - Structureless CHALK composed of fine to coarse GRAVEL of low to medium dense cream chalk with occasional black specks, and flint, with cobbles of flint and chalk. (Grade Dc) |        |       |
|           |                |                 |               |             |                       | Complete at 1.70m                                                                                                                                                                                                                                       |        |       |

|      |   |   |   |   |                |           |                 |   |
|------|---|---|---|---|----------------|-----------|-----------------|---|
| Plan |   |   |   |   | Remarks        |           |                 |   |
| .    | . | . | . | . | .              | .         | .               | . |
| .    | . | . | . | . | .              | .         | .               | . |
| .    | . | . | . | . | .              | .         | .               | . |
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| .    | . | . | . | . | .              | .         | .               | . |
| .    | . | . | . | . | .              | .         | .               | . |
|      |   |   |   |   | Scale (approx) | Logged By | Figure No.      |   |
|      |   |   |   |   | 1:25           | FW        | 24-06-12.CBR102 |   |





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Site

Land off Nursery Mews, Gravesend, Kent, DA12 5JT

**Trial Pit  
Number  
HA201**

Machine : JCB 3CX

**Method :** Trial Pit

### Dimensions

Ground Level (mOD)

Client

Helix Partnership Homes Ltd

**Job  
Number**  
24-06-12

Location (Handheld GPS)

565163 E 171457 N

## Dates

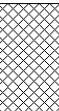
02/07/2024

Project Contractor

## Geo-Integrity

Sheet

1/1

| Depth (m) | Sample / Tests | Water Depth (m) | Field Records | Level (mOD) | Depth (m) (Thickness)  | Description                                                                                                                      | Legend                                                                              | Water |
|-----------|----------------|-----------------|---------------|-------------|------------------------|----------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------|
| 0.30      | D              |                 |               |             | (0.40)                 | MADE GROUND - (Loose) brown slightly gravelly clayey TOPSOIL. Gravel is medium to coarse quartzite and flint                     |  |       |
| 0.50      | D              |                 |               |             | 0.40<br>(0.20)<br>0.60 | SUPERFICIAL DEPOSITS - (Loose to medium dense) grey brown very gravelly silty dry CLAY. Gravel is fine to coarse chalk and flint |  |       |
|           |                |                 |               |             |                        | Complete at 0.60m                                                                                                                |                                                                                     |       |

## Plan

Remarks



**Scale (approx)**

1:25

**Logged By**

FW

Figure No.

24-06-12.HA201



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Site  
Land off Nursery Mews, Gravesend, Kent, DA12 5JT

Trial Pit  
Number  
**S A A**

|                                         |  |                                              |                     |                                       |                           |
|-----------------------------------------|--|----------------------------------------------|---------------------|---------------------------------------|---------------------------|
| Machine : JCB 3CX<br>Method : Trial Pit |  | Dimensions<br>1.41m x 0.40m x 1.40m          | Ground Level (mOD)  | Client<br>Helix Partnership Homes Ltd | Job<br>Number<br>24-06-12 |
|                                         |  | Location (Handheld GPS)<br>565144 E 171455 N | Dates<br>02/07/2024 | Project Contractor<br>Geo-Integrity   | Sheet<br>1/1              |

| Depth<br>(m) | Sample / Tests | Water<br>Depth<br>(m) | Field Records | Level<br>(mOD) | Depth<br>(m)<br>(Thickness) | Description                                                                                                                                                                                                                                             | Legend | Water |
|--------------|----------------|-----------------------|---------------|----------------|-----------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------|-------|
| 0.20         | D              |                       |               |                | (0.25)                      | MADE GROUND - (Loose to medium dense) slightly gravelly dry CLAY. Gravel is medium to coarse flint                                                                                                                                                      |        |       |
| 0.50         | D              |                       |               |                | 0.25<br>(0.45)              | SUPERFICIAL DEPOSITS - (Loose to medium dense) grey brown very gravelly silty dry CLAY. Gravel is fine to coarse chalk and flint                                                                                                                        |        |       |
| 1.20         | D              |                       |               |                | 0.70<br>(0.71)              | LEWES NODULAR, SEAFORD AND NEWHAVEN CHALK FORMATIONS (UNDIFFERENTIATED) - Structureless CHALK composed of fine to coarse GRAVEL of low to medium dense cream chalk with occasional black specks, and flint, with cobbles of flint and chalk. (Grade Dc) |        |       |
|              |                |                       |               |                | 1.41                        | Complete at 1.41m                                                                                                                                                                                                                                       |        |       |

|      |   |   |   |   |                |           |               |  |
|------|---|---|---|---|----------------|-----------|---------------|--|
| Plan |   |   |   |   | Remarks        |           |               |  |
| .    | . | . | . | . |                |           |               |  |
| .    | . | . | . | . |                |           |               |  |
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| .    | . | . | . | . |                |           |               |  |
| .    | . | . | . | . |                |           |               |  |
|      |   |   |   |   | Scale (approx) | Logged By | Figure No.    |  |
|      |   |   |   |   | 1:25           | FW        | 24-06-12.SA A |  |



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Land off Nursery Mews, Gravesend, Kent, DA12 5JT

**Trial Pit  
Number**  
**SAB**

**Method :** Trial Pit

**Dimensions**  
0.90m x 0.40m x 1.20m

Ground Level (mOD)

Helix Partnership Homes Ltd

**Job  
Number**  
24-06-12

**Location** (Handheld GPS)  
565183 E 171453 N

|              |            |
|--------------|------------|
| <b>Dates</b> | 02/07/2024 |
|--------------|------------|

**Project Contractor**  
Geo-Integrity

Sheet  
1/1

[illegible]

## Plan

Remarks



**Scale (approx)**

1:25

**Logged By**

FW

Figure No.

24-06-12.SAB

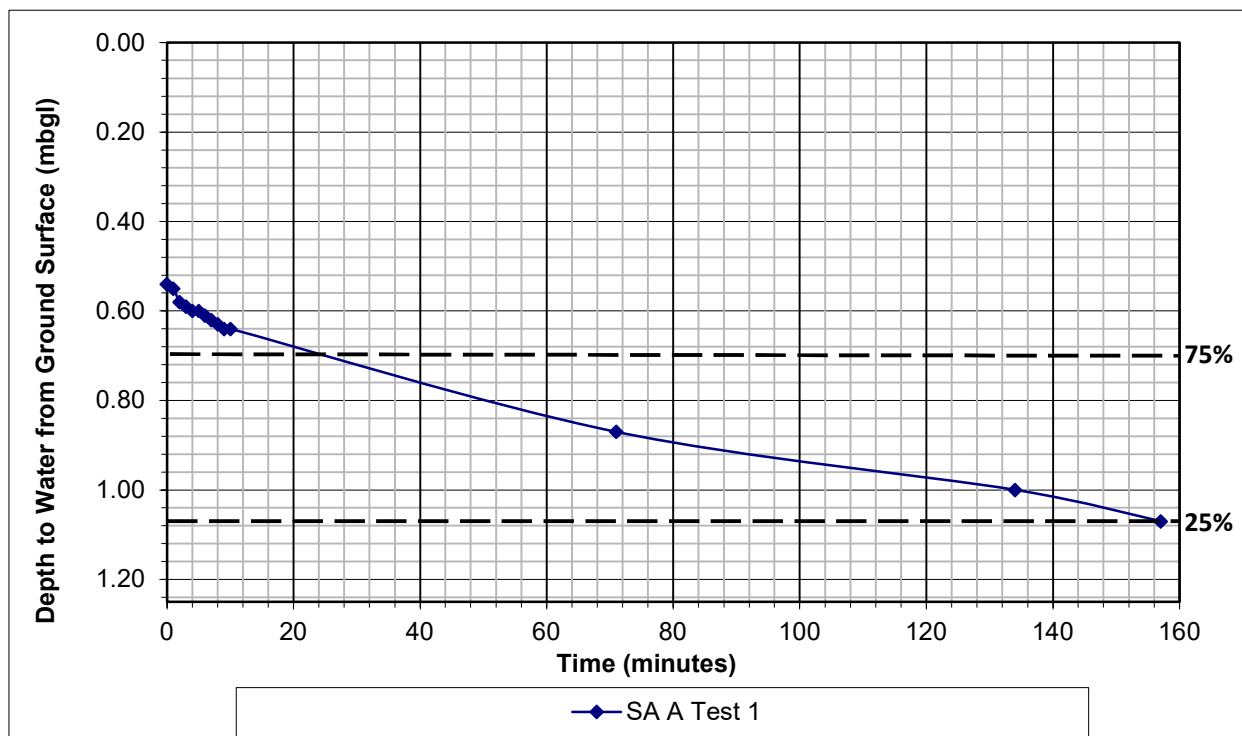
### Trial Pit Infiltration Testing to BRE Digest 365

**Client:** Helix Partnership Homes Limited      **Report No:** 24-06-12  
**Site:** Land off Nursey Mews, Gravesend      **Date Tested:** 02/07/2024  
**Dimensions:** 0.40m x 1.40m x 1.40m      **Test Location:** SA A  
 (width x length x depth)

#### **Test Response Zone Description: Lewes Nodular, Seaford & Newhaven Chalk**

| Time | Depth BGL | Time | Depth BGL | Time | Depth BGL |
|------|-----------|------|-----------|------|-----------|
| 0    | 0.54      | 7    | 0.62      |      |           |
| 1    | 0.55      | 8    | 0.63      |      |           |
| 2    | 0.58      | 9    | 0.64      |      |           |
| 3    | 0.59      | 10   | 0.64      |      |           |
| 4    | 0.60      | 71   | 0.87      |      |           |
| 5    | 0.60      | 134  | 1.00      |      |           |
| 6    | 0.61      | 157  | 1.07      |      |           |

**Average Soil Infiltration Rate:  $1.36 \times 10^{-5}$  m/s**



### Trial Pit Infiltration Testing to BRE Digest 365

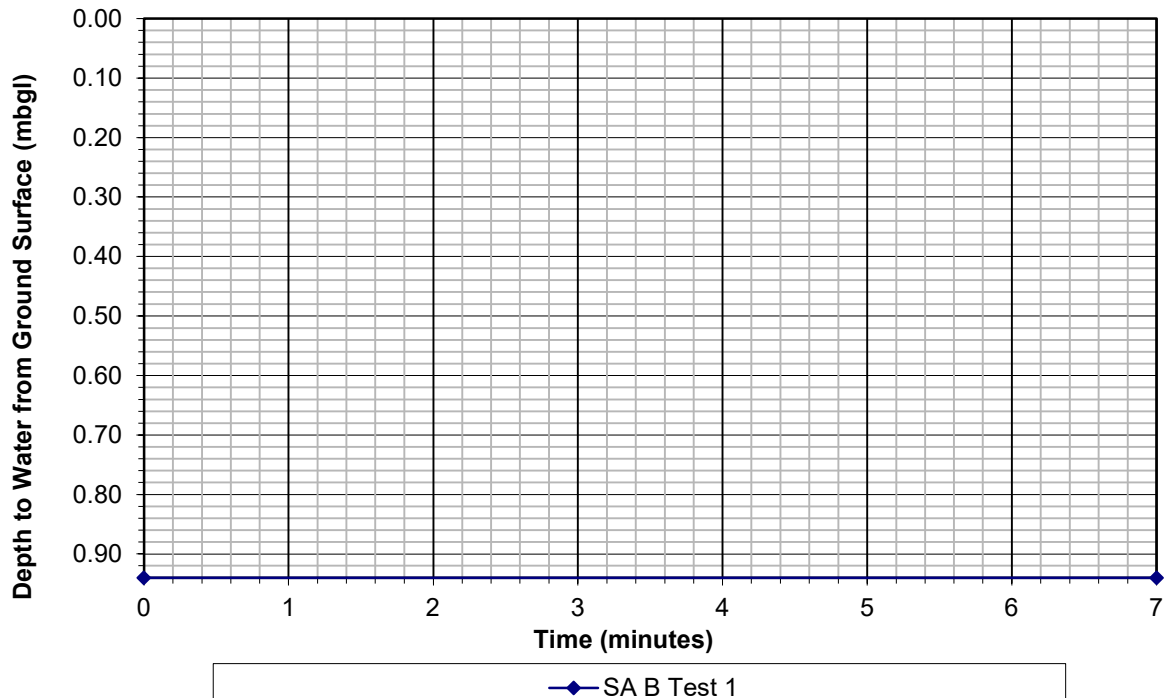
|                    |                                                   |                       |            |
|--------------------|---------------------------------------------------|-----------------------|------------|
| <b>Client:</b>     | Helix Partnership Homes Limited                   | <b>Report No:</b>     | 24-06-12   |
| <b>Site:</b>       | Land off Nursery Mews, Gravesend                  | <b>Date Tested:</b>   | 02/07/2024 |
| <b>Dimensions:</b> | 0.40m x 1.20m x 0.94m<br>(width x length x depth) | <b>Test Location:</b> | SA B       |

#### **Test Response Zone Description: Lewes Nodular, Seaford & Newhaven Chalk**

| Time | Depth BGL | Time | Depth BGL | Time | Depth BGL |
|------|-----------|------|-----------|------|-----------|
| 0    | 0.94      |      |           |      |           |
| 7    | 0.94      |      |           |      |           |
|      |           |      |           |      |           |
|      |           |      |           |      |           |
|      |           |      |           |      |           |
|      |           |      |           |      |           |
|      |           |      |           |      |           |

**Average Soil Infiltration Rate:  $2.38 \times 10^{-3}$  m/s**

**Comments: 300L added in 7 minutes; no rise in water level**



### Trial Pit Infiltration Testing to BRE Digest 365

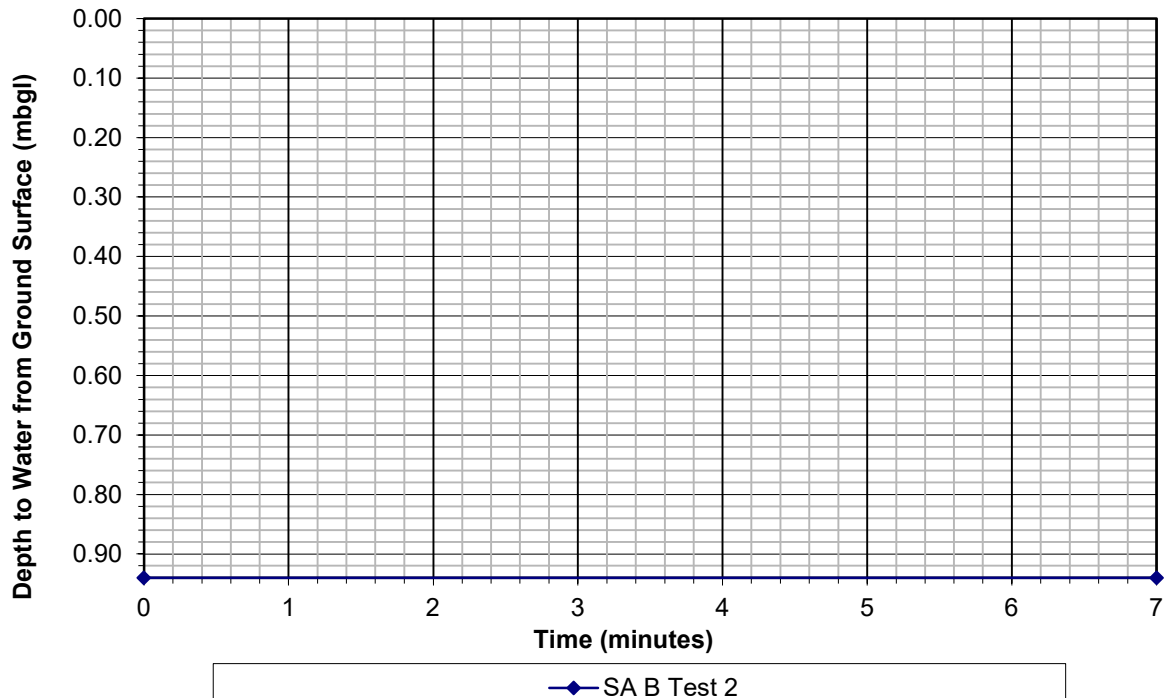
|                    |                                                   |                       |            |
|--------------------|---------------------------------------------------|-----------------------|------------|
| <b>Client:</b>     | Helix Partnership Homes Limited                   | <b>Report No:</b>     | 24-06-12   |
| <b>Site:</b>       | Land off Nursery Mews, Gravesend                  | <b>Date Tested:</b>   | 02/07/2024 |
| <b>Dimensions:</b> | 0.40m x 1.20m x 0.94m<br>(width x length x depth) | <b>Test Location:</b> | SA B       |

#### **Test Response Zone Description: Lewes Nodular, Seaford & Newhaven Chalk**

| Time | Depth BGL | Time | Depth BGL | Time | Depth BGL |
|------|-----------|------|-----------|------|-----------|
| 0    | 0.94      |      |           |      |           |
| 7    | 0.94      |      |           |      |           |
|      |           |      |           |      |           |
|      |           |      |           |      |           |
|      |           |      |           |      |           |
|      |           |      |           |      |           |
|      |           |      |           |      |           |

**Average Soil Infiltration Rate:  $2.38 \times 10^{-3}$  m/s**

**Comments: 300L added in 7 minutes; no rise in water level**



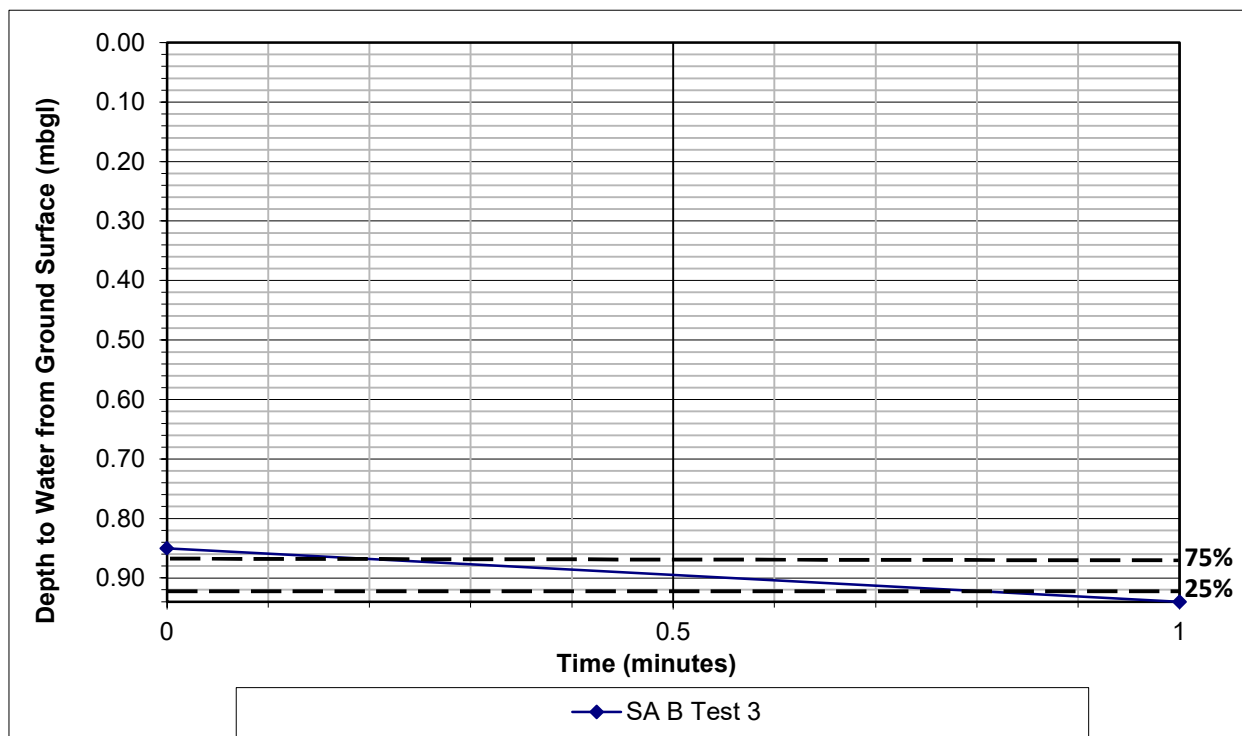
### Trial Pit Infiltration Testing to BRE Digest 365

|                    |                                                   |                       |            |
|--------------------|---------------------------------------------------|-----------------------|------------|
| <b>Client:</b>     | Helix Partnership Homes Limited                   | <b>Report No:</b>     | 24-06-12   |
| <b>Site:</b>       | Land off Nursery Mews, Gravesend                  | <b>Date Tested:</b>   | 02/07/2024 |
| <b>Dimensions:</b> | 0.40m x 1.20m x 0.94m<br>(width x length x depth) | <b>Test Location:</b> | SA B       |

#### Test Response Zone Description: Lewes Nodular, Seaford & Newhaven Chalk

| Time | Depth BGL | Time | Depth BGL | Time | Depth BGL |
|------|-----------|------|-----------|------|-----------|
| 0    | 0.85      |      |           |      |           |
| 1    | 0.94      |      |           |      |           |
|      |           |      |           |      |           |
|      |           |      |           |      |           |
|      |           |      |           |      |           |
|      |           |      |           |      |           |
|      |           |      |           |      |           |

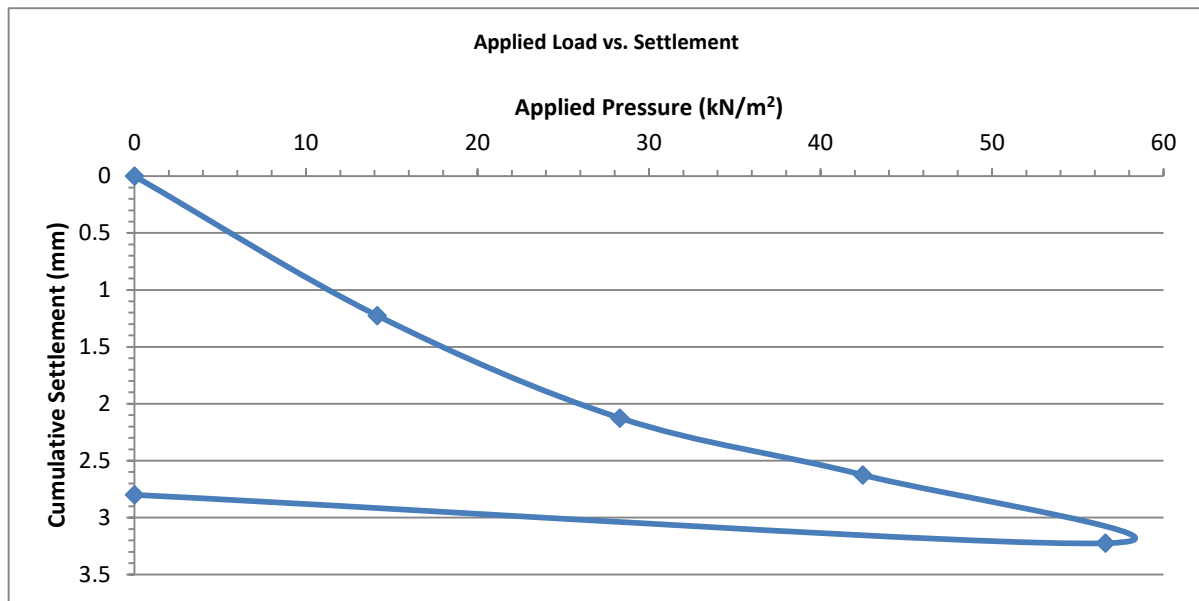
**Average Soil Infiltration Rate:  $1.05 \times 10^{-3}$  m/s**



|                                                     |
|-----------------------------------------------------|
| Seating Pressure for 1.5mm initial settlement       |
| 14 kN/m <sup>2</sup>                                |
| Pressure at 1.25mm (kN/m <sup>2</sup> )             |
| 16 kN/m <sup>2</sup>                                |
| Modulus of Subgrade Reaction (kN/m/m <sup>2</sup> ) |
| 5.65 MN/m <sup>2</sup> /m                           |
| Equivalent CBR Value (%)                            |
| 0.19 %                                              |

### Calculation of Modulus of Sub-Grade Reaction and CBR from Plate Bearing Test

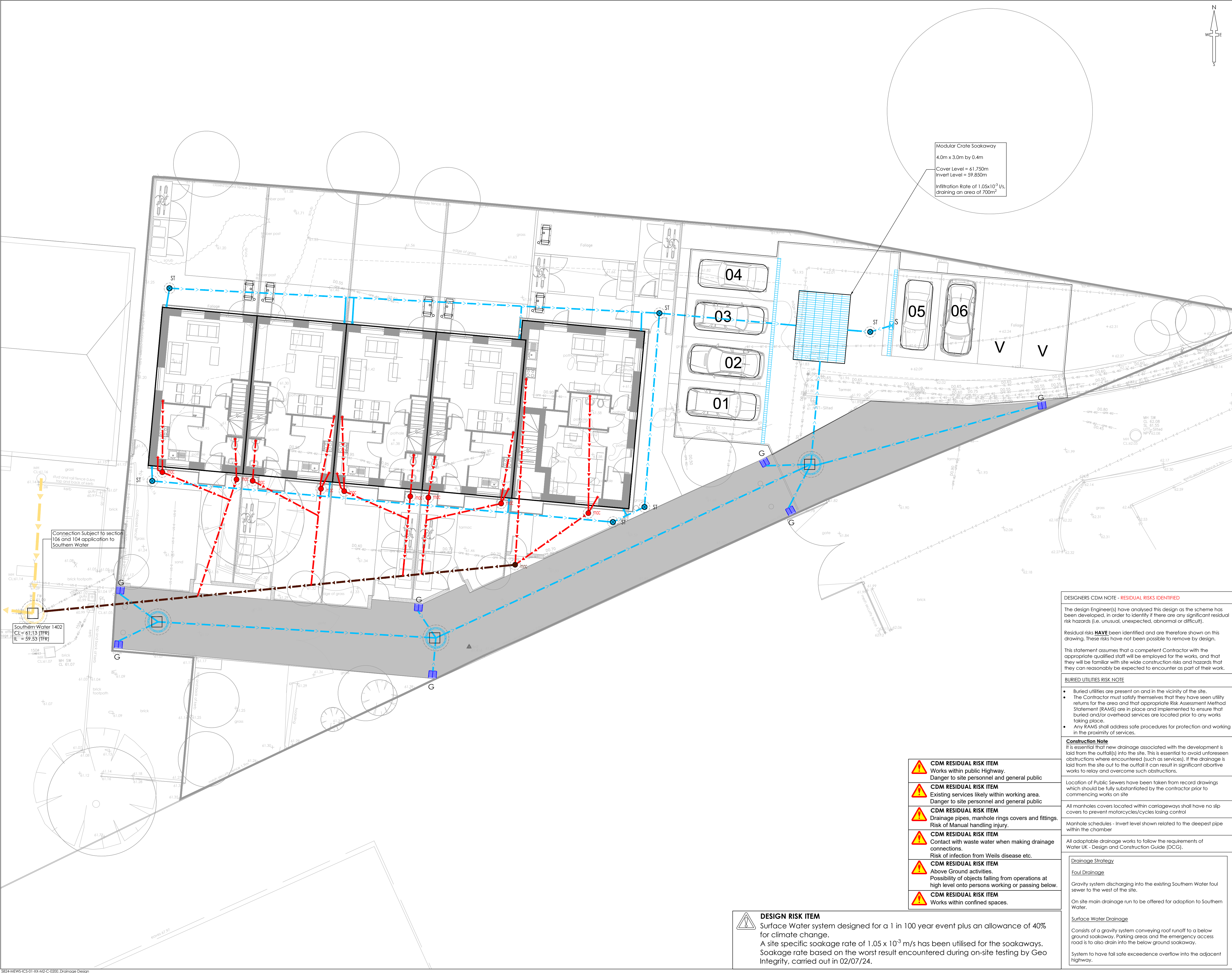
Client: Helix Partnership Homes Ltd Job No: 24-06-12  
Site: Land off Nursery Mews, Gravesend Date: 02 July 2024  
Depth (bgl): 0.2 m TP No: CBR102  
Plate Size (m): 0.3 m



| Applied Load (kN) | Applied Pressure (kN/m²) | Average Settlement (mm) |
|-------------------|--------------------------|-------------------------|
| 0                 | 0                        | 0.00                    |
| 1                 | 14                       | 1.23                    |
| 2                 | 28                       | 2.13                    |
| 3                 | 42                       | 2.63                    |
| 4                 | 57                       | 3.23                    |
| 0                 | 0                        | 2.80                    |
|                   |                          |                         |
|                   |                          |                         |
|                   |                          |                         |
|                   |                          |                         |
|                   |                          |                         |
|                   |                          |                         |
|                   |                          |                         |
|                   |                          |                         |
|                   |                          |                         |
|                   |                          |                         |
|                   |                          |                         |
|                   |                          |                         |

|                                               |
|-----------------------------------------------|
| Seating Pressure for 1.5mm initial settlement |
| 7 kN/m²                                       |
| Pressure at 1.25mm (kN/m²)                    |
| 14 kN/m²                                      |
| Modulus of Subgrade Reaction (kN/m/m²)        |
| 4.95 MN/m²/m                                  |
| Equivalent CBR Value (%)                      |
| 0.15 %                                        |

## Appendix C - Drainage Layout



**NOTES**

- All dimensions and levels are in metres unless otherwise noted
- This drawing is to be read in conjunction with the relevant Architect's/Engineer's drawings, specifications and CDM documentation
- This drawing has been produced electronically and may have been photo reduced or enlarged when copied. Work to figured dimensions only (DO NOT SCALE - EXCEPT FOR PLANNING PURPOSES). All dimensions to be checked on site. Any errors or omissions to be reported to the engineer immediately.
- This drawing contains coloured lines / information that may not be clear if reproduced in black and white.
- Digital copies of this plan can only be considered accurate if supplied directly by Infrastruct CS Ltd.

**Drainage Key**

**Sewers**

- Foul water drain (private/non adoptable)
- Surface water drain (private/non adoptable)
- Existing foul water sewer (Adopted)
- Foul water sewer (Adoptable)

**Chamber Key**

**FW/SW**

- Mini access chamber (mac) - 300mmØ
- PPIC - 475mmØ\*
- P.C.C. units/brick\*

\* General note  
(Refer to standard details & longitudinal sections for chamber sizes. Size may need to increase dependant on number of incoming pipes/size of incoming pipes)

- Surface water rodding eye
- Rain water down pipe (roddable access)
- Soil vent pipe/soil stack
- Silt Trap (ST) with removable silt bucket
- Road gully (trapped) D400
- Cellular storage (refer to drawing for sizes)
- Linear drainage channel
- Surface water sump unit

**DESIGNERS CDM NOTE - RESIDUAL RISKS IDENTIFIED**

The design Engineer(s) have analysed this design as the scheme has been developed, in order to identify if there are any significant residual risk hazards (i.e. unusual, unexpected, abnormal or difficult).

Residual risks **HAVE** been identified and are therefore shown on this drawing. These risks have not been possible to remove by design.

This statement assumes that a competent Contractor with the appropriate qualified staff will be employed for the works, and that they will be familiar with site wide construction risks and hazards that they can reasonably be expected to encounter as part of their work.

**BURIED UTILITIES RISK NOTE**

- Buried utilities are present on and in the vicinity of the site.
- The Contractor must satisfy themselves that they have seen utility returns for the area and that appropriate Risk Assessment Method Statement (RAMS) are in place and implemented to ensure that buried and/or overhead services are located prior to any works taking place.
- Any RAMS shall address safe procedures for protection and working in the proximity of services.

**Construction Note**

It is essential that new drainage associated with the development is laid from the outfall(s) into the site. This is essential to avoid unforeseen obstructions where encountered (such as services). If the drainage is laid from the site out to the outfall it can result in significant abortive works to relay and overcome such obstructions.

Location of Public Sewers have been taken from record drawings which should be fully substantiated by the contractor prior to commencing works on site

All manholes covers located within carriageways shall have no slip covers to prevent motorcycles/cycles losing control

Manhole schedules - Invert level shown related to the deepest pipe within the chamber

All adoptable drainage works to follow the requirements of Water UK - Design and Construction Guide (DCG).

**Drainage Strategy**

**Foul Drainage**

Gravity system discharging into the existing Southern Water foul sewer to the west of the site.

On site main drainage run to be offered for adoption to Southern Water.

**Surface Water Drainage**

Consists of a gravity system conveying roof runoff to a below ground soakaway. Parking areas and the emergency access road is to also drain into the below ground soakaway.

System to have fall safe exceedance overflow into the adjacent highway.

|                                                            |        |               |                                     |            |
|------------------------------------------------------------|--------|---------------|-------------------------------------|------------|
| P04                                                        | BMK    | AJG           | Layout updated                      | 23/10/24   |
| P03                                                        | BMK    | AJG           | Boundary Removed                    | 29/08/24   |
| P02                                                        | BMK    | AJG           | SVP added to the lower ground floor | 28/08/24   |
| P01                                                        | BMK    | AJG           | Initial issue                       | 14/08/24   |
| REV                                                        | DRAWN  | CHECK         | REVISION COMMENTS                   | ISSUE DATE |
| DRAWING TITLE                                              |        |               |                                     | SHEET NO.  |
| Drainage Strategy                                          |        |               |                                     | 1/1        |
| PROJECT                                                    |        |               |                                     |            |
| Land to the West of Nursery Mews Gravesend, Kent, DA11 7BU |        |               |                                     |            |
| CLIENT                                                     |        |               |                                     |            |
|                                                            |        |               |                                     |            |
| SCALE @ A1                                                 |        |               |                                     | ENGINEER   |
| 1:100                                                      |        |               |                                     | AJG        |
| PROJECT NUMBER                                             | STATUS | ISSUE PURPOSE |                                     | DRAWN      |
| 5824                                                       | S2     | INFORMATION   |                                     | NJ         |
| PROJECT                                                    | ORIGIN | PHASE         | LEVEL                               | TYPE       |
| MEWS                                                       | ICS    | 01            | XX                                  | DR         |
| ROLE                                                       | NO.    |               | REVISION                            |            |
| C                                                          | 0200   |               | P04                                 |            |

## Appendix D - Drainage Calculation

|                                                                                  |  |                                                                                        |             |                                                                                     |              |
|----------------------------------------------------------------------------------|--|----------------------------------------------------------------------------------------|-------------|-------------------------------------------------------------------------------------|--------------|
| Project:<br>Infiltration Design<br>Land to the West of Nursery Mews<br>Gravesend |  | Date:<br>25/07/2024                                                                    |             |  |              |
|                                                                                  |  | Designed by:<br>BMK                                                                    | Checked by: |                                                                                     | Approved By: |
| Report Details:<br>Type: Inflow Summary<br>Storm Phase: Phase                    |  | Company Address:<br>Infrastruct CS<br>The Stable, High Cogges Farm<br>Witney, OX29 6UN |             |                                                                                     |              |

| Inflow Label        | Connected To | Flow (L/s) | Runoff Method         | Area (ha)    | Percentage Impervious (%) | Urban Creep (%) | Adjusted Percentage Impervious (%) | Area Analysed (ha) |
|---------------------|--------------|------------|-----------------------|--------------|---------------------------|-----------------|------------------------------------|--------------------|
| Catchment Area (4)  | Manhole (2)  |            | Time of Concentration | 0.006        | 100                       | 0               | 100                                | 0.006              |
| Catchment Area (5)  | Cover        |            | Time of Concentration | 0.008        | 100                       | 0               | 100                                | 0.008              |
| Catchment Area (6)  | Cover        |            | Time of Concentration | 0.007        | 100                       | 0               | 100                                | 0.007              |
| Catchment Area (7)  | Manhole (5)  |            | Time of Concentration | 0.004        | 100                       | 0               | 100                                | 0.004              |
| Catchment Area (8)  | Manhole (5)  |            | Time of Concentration | 0.005        | 100                       | 0               | 100                                | 0.005              |
| Catchment Area (9)  | Manhole (6)  |            | Time of Concentration | 0.005        | 100                       | 0               | 100                                | 0.005              |
| Catchment Area (10) | Manhole (6)  |            | Time of Concentration | 0.007        | 100                       | 0               | 100                                | 0.007              |
| Roof Area           | Manhole      |            | Time of Concentration | 0.006        | 100                       | 10              | 110                                | 0.007              |
| Roof Area (1)       | Manhole (1)  |            | Time of Concentration | 0.008        | 100                       | 10              | 110                                | 0.009              |
| Roof Area (2)       | Manhole (3)  |            | Time of Concentration | 0.006        | 100                       | 10              | 110                                | 0.006              |
| Roof Area (3)       | Manhole (4)  |            | Time of Concentration | 0.006        | 100                       | 10              | 110                                | 0.007              |
| <b>TOTAL</b>        |              | <b>0.0</b> |                       | <b>0.067</b> |                           |                 |                                    | <b>0.070</b>       |

|                                                                                        |                     |                                                                                     |             |              |
|----------------------------------------------------------------------------------------|---------------------|-------------------------------------------------------------------------------------|-------------|--------------|
| Project:<br>Infiltration Design<br>Land to the West of Nursery Mews<br>Gravesend       | Date:<br>25/07/2024 |  |             |              |
| Report Details:<br>Type: Network Design Criteria<br>Storm Phase: Phase                 | Designed by:<br>BMK |                                                                                     | Checked by: | Approved By: |
| Company Address:<br>Infrastruct CS<br>The Stable, High Cogges Farm<br>Witney, OX29 6UN |                     |                                                                                     |             |              |

Flow Options

|                           |                               |
|---------------------------|-------------------------------|
| Peak Flow Calculation     | (UK) Modified Rational Method |
| Min. Time of Entry (mins) | 5                             |
| Max. Travel Time (mins)   | 30                            |

Pipe Options

|                       |                          |
|-----------------------|--------------------------|
| Lock Slope Options    | None                     |
| Design Options        | Minimise Excavation      |
| Design Level          | Level Soffits            |
| Min. Cover Depth (m)  | 1.200                    |
| Min. Slope (1:X)      | 500.00                   |
| Max. Slope (1:X)      | 40.00                    |
| Min. Velocity (m/s)   | 1.0                      |
| Max. Velocity (m/s)   | 3.0                      |
| Use Flow Restriction  | <input type="checkbox"/> |
| Reduce Channel Depths | <input type="checkbox"/> |

Pipe Size Library

Default

|                     |    |
|---------------------|----|
| Add. Increment (mm) | 75 |
| Max. Diameter (mm)  | 0  |

| Diameter (mm) | Min. Slope (1:X) | Max. Slope (1:X) |
|---------------|------------------|------------------|
| 100           | 0.00             | 0.00             |
| 150           | 0.00             | 0.00             |

|                                                                                  |                                                                                        |             |              |
|----------------------------------------------------------------------------------|----------------------------------------------------------------------------------------|-------------|--------------|
| Project:<br>Infiltration Design<br>Land to the West of Nursery Mews<br>Gravesend | Date:<br>25/07/2024                                                                    |             |              |
|                                                                                  | Designed by:<br>BMK                                                                    | Checked by: | Approved By: |
| Report Details:<br>Type: Network Design Criteria<br>Storm Phase: Phase           | Company Address:<br>Infrastruct CS<br>The Stable, High Cogges Farm<br>Witney, OX29 6UN |             |              |



Manhole Options

Apply Offset ☐

Manhole Size Library

Default

Diameter / Width

| Connection (mm) | Diameter / Length (m) | Width (m) |
|-----------------|-----------------------|-----------|
| 0               | 1.200                 | 0.000     |
| 375             | 1.350                 | 0.000     |
| 500             | 1.500                 | 0.000     |
| 750             | 1.800                 | 0.000     |

Additional Sizing

|                       |       |
|-----------------------|-------|
| Connection (mm)       | 900   |
| Diameter / Length (m) | 0.900 |
| Width (m)             | 0.000 |

Depth

| Depth (m) | Diameter / Length (m) | Width (m) |
|-----------|-----------------------|-----------|
| 0.000     | 1.050                 | 0.000     |
| 1.500     | 1.200                 | 0.000     |

Access

| Depth (m) | Ladder Protrusion (mm) |
|-----------|------------------------|
| 0.000     | 130                    |
| 3.000     | 230                    |

Benching Requirements

|                     |     |
|---------------------|-----|
| Landing Width (mm)  | 500 |
| Benching Width (mm) | 225 |

|                                                                                  |                                                                                        |             |              |                                                                                     |
|----------------------------------------------------------------------------------|----------------------------------------------------------------------------------------|-------------|--------------|-------------------------------------------------------------------------------------|
| Project:<br>Infiltration Design<br>Land to the West of Nursery Mews<br>Gravesend | Date:<br>25/07/2024                                                                    |             |              |  |
|                                                                                  | Designed by:<br>BMK                                                                    | Checked by: | Approved By: |                                                                                     |
| Report Title:<br><br>Rainfall Analysis Criteria                                  | Company Address:<br>Infrastruct CS<br>The Stable, High Cogges Farm<br>Witney, OX29 6UN |             |              |                                                                                     |

|                                 |                          |
|---------------------------------|--------------------------|
| Runoff Type                     | Dynamic                  |
| Output Interval (mins)          | 1                        |
| Time Step                       | Shortest                 |
| Urban Creep                     | Use Catchment Values     |
| Junction Flood Risk Margin (mm) | 300                      |
| Perform No Discharge Analysis   | <input type="checkbox"/> |

|                                                                                  |  |                                                                                        |             |                                                                                     |              |
|----------------------------------------------------------------------------------|--|----------------------------------------------------------------------------------------|-------------|-------------------------------------------------------------------------------------|--------------|
| Project:<br>Infiltration Design<br>Land to the West of Nursery Mews<br>Gravesend |  | Date:<br>25/07/2024                                                                    |             |  |              |
|                                                                                  |  | Designed by:<br>BMK                                                                    | Checked by: |                                                                                     | Approved By: |
| Report Details:<br>Type: Junctions Summary<br>Storm Phase: Phase                 |  | Company Address:<br>Infrastruct CS<br>The Stable, High Cogges Farm<br>Witney, OX29 6UN |             |                                                                                     |              |



FSR: 100 years: Increase Rainfall (%): +40: Critical Storm Per Item: Rank By: Max. Depth

| Junction    | Storm Event                                  | Cover Level (m) | Invert Level (m) | Max. Level (m) | Max. Depth (m) | Max. Inflow (L/s) | Max. Resident Volume (m³) | Max. Flooded Volume (m³) | Max. Outflow (L/s) | Total Discharge Volume (m³) | Status     |
|-------------|----------------------------------------------|-----------------|------------------|----------------|----------------|-------------------|---------------------------|--------------------------|--------------------|-----------------------------|------------|
| Manhole     | FSR: 100 years:<br>+40 %: 30 mins:<br>Summer | 61.30<br>0      | 60.85<br>0       | 61.085         | 0.235          | 5.2               | 0.017                     | 0.000                    | 4.8                | 3.053                       | Flood Risk |
| Manhole (1) | FSR: 100 years:<br>+40 %: 30 mins:<br>Summer | 61.64<br>0      | 60.54<br>0       | 61.085         | 0.545          | 11.0              | 0.087                     | 0.000                    | 10.7               | 7.040                       | Surcharged |
| Manhole (2) | FSR: 100 years:<br>+40 %: 30 mins:<br>Summer | 61.74<br>0      | 60.44<br>0       | 61.085         | 0.645          | 23.3              | 0.103                     | 0.000                    | 23.1               | 15.551                      | Surcharged |
| Manhole (3) | FSR: 100 years:<br>+40 %: 30 mins:<br>Summer | 61.30<br>0      | 60.85<br>0       | 61.084         | 0.234          | 4.4               | 0.017                     | 0.000                    | 4.4                | 2.820                       | Flood Risk |
| Manhole (4) | FSR: 100 years:<br>+40 %: 30 mins:<br>Summer | 61.55<br>0      | 60.55<br>0       | 61.086         | 0.536          | 12.7              | 0.085                     | 0.000                    | 8.8                | 6.042                       | Surcharged |
| Manhole (5) | FSR: 100 years:<br>+40 %: 30 mins:<br>Summer | 61.20<br>0      | 60.70<br>0       | 61.092         | 0.392          | 6.0               | 0.443                     | 0.000                    | 6.2                | 3.841                       | Flood Risk |
| Manhole (6) | FSR: 100 years:<br>+40 %: 30 mins:<br>Summer | 61.70<br>0      | 60.50<br>0       | 61.090         | 0.590          | 14.2              | 0.667                     | 0.000                    | 13.8               | 8.950                       | Surcharged |

|                                                                                  |  |                                                                                        |             |                                                                                     |              |
|----------------------------------------------------------------------------------|--|----------------------------------------------------------------------------------------|-------------|-------------------------------------------------------------------------------------|--------------|
| Project:<br>Infiltration Design<br>Land to the West of Nursery Mews<br>Gravesend |  | Date:<br>25/07/2024                                                                    |             |  |              |
|                                                                                  |  | Designed by:<br>BMK                                                                    | Checked by: |                                                                                     | Approved By: |
| Report Details:<br>Type: Stormwater Controls Summary<br>Storm Phase: Phase       |  | Company Address:<br>Infrastruct CS<br>The Stable, High Cogges Farm<br>Witney, OX29 6UN |             |                                                                                     |              |



**FSR: 100 years: Increase Rainfall (%): +40: Critical Storm Per Item: Rank By: Max. US Depth**

| Stormwater Control | Storm Event                            | Max. Avg. Level (m) | Max. Avg. Depth (m) | Max. Inflow (L/s) | Max. Resident Volume (m³) | Max. Outflow (L/s) | Total Discharge Volume (m³) | Half Drain Down Time (mins) | Percentage Available (%) | Status |
|--------------------|----------------------------------------|---------------------|---------------------|-------------------|---------------------------|--------------------|-----------------------------|-----------------------------|--------------------------|--------|
| Cover              | FSR: 100 years: +40 %: 30 mins: Summer | 61.083              | 1.233               | 47.0              | 9.536                     | 0.0                | 0.152                       | 8                           | 6.696                    | OK     |

|                                                                                  |                                                                                        |             |              |                                                                                     |
|----------------------------------------------------------------------------------|----------------------------------------------------------------------------------------|-------------|--------------|-------------------------------------------------------------------------------------|
| Project:<br>Infiltration Design<br>Land to the West of Nursery Mews<br>Gravesend | Date:<br>25/07/2024                                                                    |             |              |  |
|                                                                                  | Designed by:<br>BMK                                                                    | Checked by: | Approved By: |                                                                                     |
| Report Details:<br>Type: Stormwater Control Results<br>Storm Phase: Phase        | Company Address:<br>Infrastruct CS<br>The Stable, High Cogges Farm<br>Witney, OX29 6UN |             |              |                                                                                     |
|                                                                                  |                                                                                        |             |              |                                                                                     |

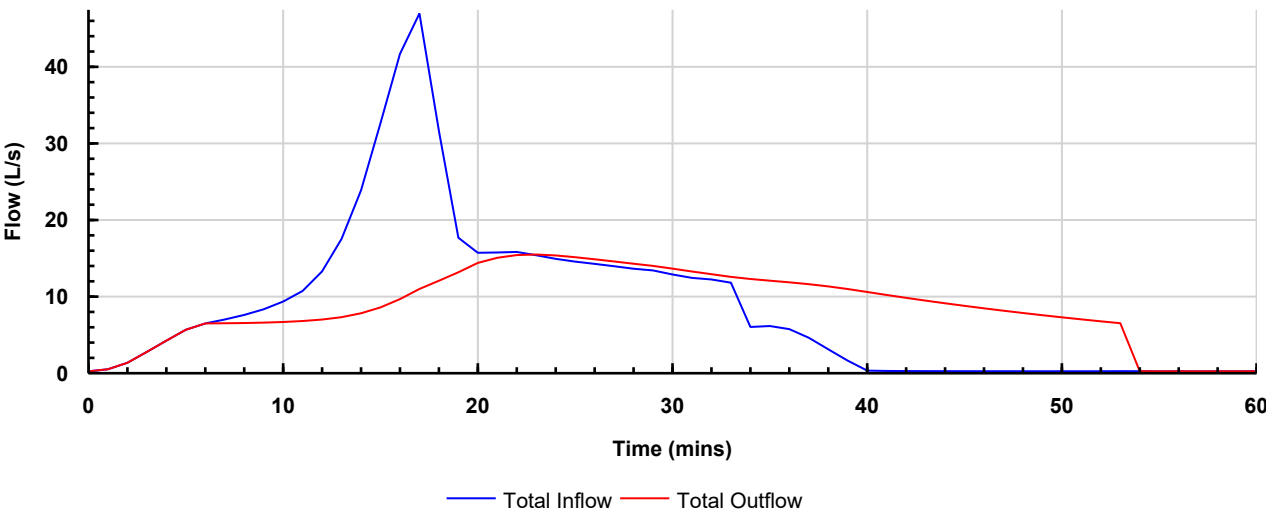


**Cover**  
 Critical by Return Period: FSR: 100 years: Increase Rainfall (%): +40: 30 mins: Summer

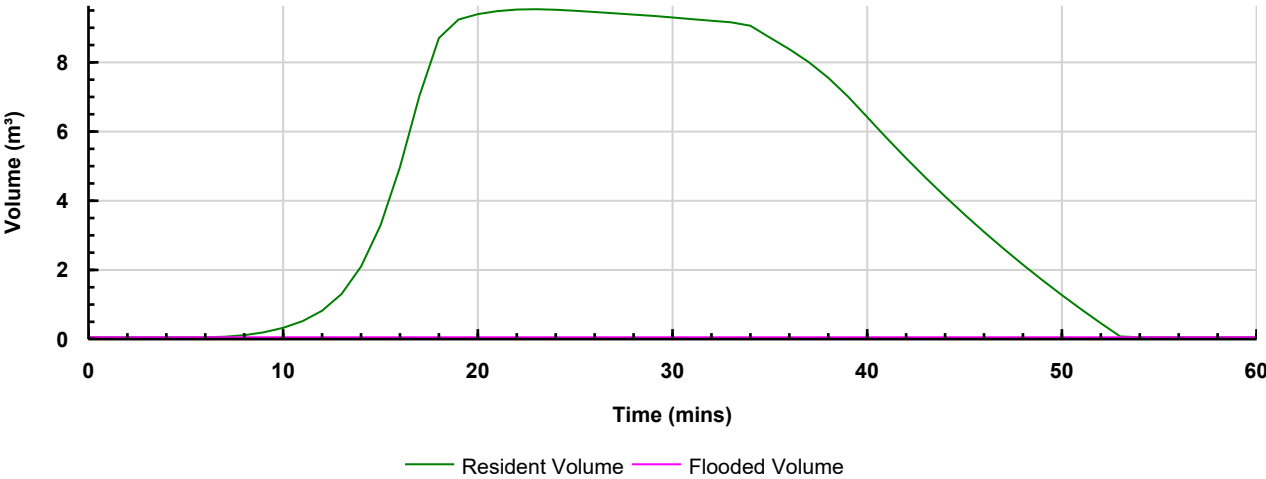
Type : Tank

Graphs

Flow Graph



Volume Graph



|                                                                                  |                                                                    |             |                  |                                                                                     |
|----------------------------------------------------------------------------------|--------------------------------------------------------------------|-------------|------------------|-------------------------------------------------------------------------------------|
| Project:<br>Infiltration Design<br>Land to the West of Nursery Mews<br>Gravesend | Date:<br>25/07/2024                                                |             |                  |  |
|                                                                                  | Designed by:                                                       | Checked by: | Approved By:     |                                                                                     |
|                                                                                  | BMK                                                                |             |                  |                                                                                     |
| Report Details:                                                                  |                                                                    |             | Company Address: |                                                                                     |
| Type: Stormwater Control Results<br>Storm Phase: Phase                           | Infrastruct CS<br>The Stable, High Cogges Farm<br>Witney, OX29 6UN |             |                  |                                                                                     |

Depth Graph

