

## **PLANNING REF: 135952/FO/2023**

Version        P01  
Date            23.06.2023

### **1. INTRODUCTION**

As part of the Planning Application 135952/FO/2023 for the severable and phased construction of five industrial units with ancillary offices, associated service yards, parking, landscaping, amenity space and infrastructure, with vehicular access off Simonsway; both the LLFA and United Utilities have provided comment on the drainage strategy.

Ridge and Partners have prepared this Technical Note in response to the comments and queries raised by both Manchester City Council as the LLFA, and United Utilities. The comments have been summarised in table format below, with the corresponding responses.

## 2. CONSULTEE COMMENTS

### 2.1 Manchester City Council (LLFA)

|   | LLFA Comment                                                                                                                                                                                                                                                                                                                                                                                  | Ridge Response                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
|---|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 1 | <i>A finalised drainage layout showing all components, outfalls, levels and connectivity</i>                                                                                                                                                                                                                                                                                                  | Drainage strategy layout is contained within <b>Appendix A</b> .<br>Element of planning condition accepted, based on the need for infiltration testing during site investigation.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
| 2 | <i>Maximised integration of green SuDS components (utilising infiltration or attenuation) if practicable</i>                                                                                                                                                                                                                                                                                  | No soft SuDS are proposed as Manchester Airport Group (MAG) will not accept any form of green SuDS that may encourage the assembly of birds resulting in any disturbance to flight paths.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
| 3 | <i>Details of surface water attenuation that offers a reduction in surface water runoff rate in line with the Manchester Trafford and Salford Strategic Flood Risk Assessment, i.e. at least a 50% reduction in runoff rate compared to the existing rates with the aim of reducing to the greenfield runoff rates, as the site is located within Conurbation Core Critical Drainage Area</i> | It is proposed to restrict surface water flows from the proposed development to the Qbar rate of <b><u>37 l/s</u></b> . Attenuation is proposed in the form of Oversized Pipes and Geocellular storage tanks wrapped with an impermeable membrane. Geocellular tanks are designed to store excess rain water within the voids (typically 95%) until the allowable discharge rate from site permits the rain water to join the off-site network.<br><br>A surface water network has been modelled within Innovyze MicroDrainage software to determine the volume of storage tank required for the rainfall events up to and including the 1 in 100 year + 45% climate change event. This has been calculated as <b><u>5,410cu.m</u></b> .<br><br>The system has been simulated in MicroDrainage for the 1 in 1 year, 1 in 30 year +40% climate change and 1 in 100 year +45% climate change event. In summary, there is no surcharging of the system during the 1 in 1 year storm. During the 1 in 30 year +40% climate change event and the 1 in |

|   |                                                                                                                                                                                                                                                                                                                   |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
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|   |                                                                                                                                                                                                                                                                                                                   | <p>100 year +45% climate change event, all surface water runoff is stored within the system for the duration of the storm.</p> <p>This is demonstrated by the drainage calculations contained within <b>Appendix B</b>.</p>                                                                                                                                                                                                                                                                                                  |
| 4 | <i>An existing and proposed impermeable areas drawing to accompany all discharge rate calculations.</i>                                                                                                                                                                                                           | <p>As it is proposed to restrict to the greenfield rates (Qbar), the maximum allowable discharge rate has been calculated based on the total proposed impermeable area of 7.198ha. This is demonstrated on the proposed impermeable area plan contained in <b>Appendix A</b>.</p>                                                                                                                                                                                                                                            |
| 5 | <i>Runoff volume in the 1 in 100 year, 6 hours rainfall shall be constrained to a value as close as is reasonably practicable to the greenfield runoff volume for the same event, but never to exceed the runoff volume from the development site prior to redevelopment</i>                                      | <p>In accordance with the North West SuDS Pro-Forma, justification has been provided that the provision of volume control/long term storage is not appropriate and an attenuation only approach is proposed. All events upto the critical duration 1 in 100 year event (plus climate change allowance) are limited to Qbar (1 in 2 year greenfield rate), therefore no volume calculations are require for the 1 in 100 year 6 hour rainfall event.</p>                                                                      |
| 6 | <i>Evidence that the drainage system has been designed (unless an area is designated to hold and/or convey water as part of the design) so that flooding does not occur during a 1 in 100 year rainfall event with allowance for 45% climate change in any part of a building</i>                                 | <p>The system has been simulated in MicroDrainage for the 1 in 1 year, 1 in 30 year +40% climate change and 1 in 100 year +45% climate change event. In summary, there is no surcharging of the system during the 1 in 1 year storm. During the 1 in 30 year +40% climate change event and the 1 in 100 year +45% climate change event, all surface water runoff is stored within the system for the duration of the storm.</p> <p>This is demonstrated by the drainage calculations contained within <b>Appendix B</b>.</p> |
| 7 | <i>Assessment of overland flow routes for extreme events that is diverted away from buildings (including basements) and managed within the proposed development boundary. Overland flow routes need to be designed to convey the flood water in a safe manner in the event of a blockage or exceedance of the</i> | <p>Condition is accepted – once the final drainage design is submitted – it will include an overland flow plan.</p>                                                                                                                                                                                                                                                                                                                                                                                                          |

|                        | <i>proposed drainage system capacity including inlet structures. A layout with overland flow routes needs to be presented with appreciation of these overland flow routes with regards to the properties on site and adjacent properties off site</i>                                                                                                                                                                                                                                                                                                                               |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |        |             |                             |                        |    |                                                                                                                                                                                                                         |
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| 8                      | <i>Progression through the drainage hierarchy shall be evidence based and supported by site investigation. Results of ground investigation carried out under Building Research Establishment Digest 365. Site investigations should be undertaken in locations and at proposed depths of the proposed infiltration devices. Proposal of the attenuation that is achieving half emptying time within 24 hours. If no ground investigations are possible or infiltration is not feasible on site, evidence of alternative surface water disposal routes (as follows) is required.</i> | <p><b><u>Discharge of Surface Water</u></b></p> <p>In accordance with National Planning Policy Framework (2022) and Building Regulations Approved Document H, disposal of surface water from new developments should follow the hierarchy below:</p> <ol style="list-style-type: none"> <li>1. Discharge to ground via infiltration</li> <li>2. Discharge to watercourse</li> <li>3. Discharge to surface water sewer</li> <li>4. Discharge to combined sewer</li> </ol> <p>Based on an assessment of local site condition, the hierarchy for surface water disposal at the development site is summarised in Table 2 and in greater detail below:</p> <p><i>Table 2 – Hierarchy for Surface Water Disposal</i></p> <table> <tr> <th>Method</th><th>Suitability</th><th>Suitability for Development</th></tr> <tr> <td>Infiltration to Ground</td><td>No</td><td>Based on a desk top assessment of local ground conditions it is believed that infiltration is unlikely to be suitable, however infiltration will be investigated further during the intrusive site investigation works.</td></tr> </table> | Method | Suitability | Suitability for Development | Infiltration to Ground | No | Based on a desk top assessment of local ground conditions it is believed that infiltration is unlikely to be suitable, however infiltration will be investigated further during the intrusive site investigation works. |
| Method                 | Suitability                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | Suitability for Development                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |        |             |                             |                        |    |                                                                                                                                                                                                                         |
| Infiltration to Ground | No                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | Based on a desk top assessment of local ground conditions it is believed that infiltration is unlikely to be suitable, however infiltration will be investigated further during the intrusive site investigation works.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |        |             |                             |                        |    |                                                                                                                                                                                                                         |

|  |  |                                   |     |                                                                                                                                                                                                                                                                                                                                |
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|  |  | Connection to Watercourse         | No  | There are 2 watercourses within 500m of the site. Each of the watercourses already present flood risks to existing settlements. The existing site does not currently drain to either of these watercourses. As such, any new connection to either watercourse has the potential to increase flood risk downstream of the site. |
|  |  | Connection to Surface Water Sewer | No  | As the UU SW sewer discharges to the Baguley Brook tributary and the site does not have an existing connection, any new connection to this sewer has the potential to increase flood risk downstream                                                                                                                           |
|  |  | Connection to Combined Sewer      | Yes | The site has been proven to already drain to the combined sewer                                                                                                                                                                                                                                                                |

**Infiltration**

According to the BGS, the site is underlain by Devensian Till superficial deposits, which are classed as a Secondary, undifferentiated Aquifer. The superficial deposits are underlain by, predominantly, Bollin Mudstone formation (Secondary B Aquifer), with a small area of Helsby Sandstone formation (principal Aquifer to the northeast corner of the site).

Landis Soilscales describe the soils as slowly permeable, seasonally wet, loamy and clayey with impeded drainage characteristics. Taking this into consideration along with the BGS mapping, at this stage. it is considered extremely unlikely that infiltration is a feasible method of surface water disposal for the proposed development. Infiltration will however be investigated further by means of BRE 365 testing during the intrusive site investigations.

**Discharge to Watercourse**

There is a Main River (Gatley Brook) 200m east of the site. The main river flows north to the River Mersey and is a mixture of open channel and culverted watercourse.

Gatley Brook is a principal flood risk generator within Gatley Town Centre.

There is a culverted ordinary watercourse approximately 400m west of the site (a tributary of Baguley Brook). This watercourse is shown as a flood risk generator through Sharston.

Figure 1 below demonstrates the downstream flood risk to Gatley and Sharston attributed to the two aforementioned watercourses.



|   |                                                                                                                                                                                                                                                                                                                             |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
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|   |                                                                                                                                                                                                                                                                                                                             | <p><i>Figure 3 – GOV.UK Extents of Surface Water Flooding</i></p> <p>Given that there is already a downstream flood risk to properties in Gatley and Sharston which would only be exacerbated by introducing new surface water flows to the nearby watercourses, we request the LLFA discount discharge to watercourse as a viable method of surface water disposal in order to protect downstream properties.</p> <p><b><u>Discharge to Surface Water Sewer</u></b></p> <p>As the local surface water sewers in the area ultimately discharge to the watercourses referred to above, a new discharge to surface water sewer would have the same effect as a direct discharge to watercourse, exacerbating the downstream flood risk to properties in Gatley and Sharston. On this basis, discharge to surface water sewer has been discounted as a viable method of surface water disposal for the proposed development.</p> <p><b><u>Discharge to Combined Water Sewer</u></b></p> <p>The existing impermeable areas from the site all have a positive drainage system which is indicated on the GPR survey shown in Figure 2 below. This on site network has a single known point of connection to the public combined sewer. Therefore, discharge to combined sewer is considered the most appropriate and sustainable method of surface water disposal from the proposed development.</p> |
| 9 | <p><i>Where surface water is connected to the public sewer, agreement in principle from United Utilities is required that there is adequate spare capacity in the existing system taking future development requirements into account. An email of acceptance of proposed flows and/or new connection will suffice.</i></p> | <p>The proposal to connect to the UU sewer is predicated on the risk of flooding potentially generated by connecting new flows to the watercourses adjacent to the site, that are already considered flood risk generators. Can the LLFA please pass comment on the assessment in Point 8 above.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |

| 10                     | <i>For sites where proposed development would cause pollution risk to surface water, evidence of pollution control measures (preferably through SuDS) is required.</i>                                                                                                                 | It is proposed to drain any parking areas greater than 800sq.m and/or any HGV turning areas through suitable proprietary oil separators to provide treatment to surface water runoff. These, along with catchpit chambers to remove silts and debris will provide the required treatment.<br><br>As part of the proposed drainage design a submission in line with the simple index approach will be provided.                                                                                                                                                                             |                      |                 |                       |                        |                                                             |                          |                        |                          |                                    |                          |
|------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------|-----------------|-----------------------|------------------------|-------------------------------------------------------------|--------------------------|------------------------|--------------------------|------------------------------------|--------------------------|
| 11                     | <i>Hydraulic calculation of the proposed drainage system including all parameters of the model;</i>                                                                                                                                                                                    | Hydraulic calculations are contained within <b>Appendix B</b> .                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |                      |                 |                       |                        |                                                             |                          |                        |                          |                                    |                          |
| 12                     | <i>Construction details of flow control and SuDS elements.</i>                                                                                                                                                                                                                         | This element of the condition is accepted - These will be provided as part of the detailed design.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |                      |                 |                       |                        |                                                             |                          |                        |                          |                                    |                          |
| 13                     | <i>Verification report providing photographic evidence of construction as per design drawings</i>                                                                                                                                                                                      | This will be provided with during/after construction.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |                      |                 |                       |                        |                                                             |                          |                        |                          |                                    |                          |
| 14                     | <i>As built construction drawings if different from design construction drawings</i>                                                                                                                                                                                                   | This will be provided post-construction.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |                      |                 |                       |                        |                                                             |                          |                        |                          |                                    |                          |
| 15                     | <i>Management and maintenance plan for the lifetime of the development which shall include the arrangements for adoption by any public body or statutory undertaker, or any other arrangements to secure the operation of the sustainable drainage scheme throughout its lifetime.</i> | Refer to Tables 3 and 4 below.<br><br><i>Table 3 – Pipes and Manholes Maintenance Schedule</i><br><table border="1"> <thead> <tr> <th>Maintenance schedule</th><th>Required Action</th><th>Recommended Frequency</th></tr> </thead> <tbody> <tr> <td rowspan="3">Occasional maintenance</td><td>Visual inspection of covers, gratings and manhole chambers.</td><td>Annually or as required.</td></tr> <tr> <td>Cleaning out manholes.</td><td>Annually or as required.</td></tr> <tr> <td>CCTV inspection of drainage pipes.</td><td>Annually or as required.</td></tr> </tbody> </table> | Maintenance schedule | Required Action | Recommended Frequency | Occasional maintenance | Visual inspection of covers, gratings and manhole chambers. | Annually or as required. | Cleaning out manholes. | Annually or as required. | CCTV inspection of drainage pipes. | Annually or as required. |
| Maintenance schedule   | Required Action                                                                                                                                                                                                                                                                        | Recommended Frequency                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |                      |                 |                       |                        |                                                             |                          |                        |                          |                                    |                          |
| Occasional maintenance | Visual inspection of covers, gratings and manhole chambers.                                                                                                                                                                                                                            | Annually or as required.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |                      |                 |                       |                        |                                                             |                          |                        |                          |                                    |                          |
|                        | Cleaning out manholes.                                                                                                                                                                                                                                                                 | Annually or as required.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |                      |                 |                       |                        |                                                             |                          |                        |                          |                                    |                          |
|                        | CCTV inspection of drainage pipes.                                                                                                                                                                                                                                                     | Annually or as required.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |                      |                 |                       |                        |                                                             |                          |                        |                          |                                    |                          |

|  |  |                                                 |                                                                                                |                                                    |
|--|--|-------------------------------------------------|------------------------------------------------------------------------------------------------|----------------------------------------------------|
|  |  | Remedial actions                                | Reactive cleaning of manholes and drains.                                                      | During flooding events.                            |
|  |  |                                                 | Cleaning out drains by water jetting.                                                          | As required.                                       |
|  |  |                                                 | Replace damaged covers, grating and manhole components.                                        | As required.                                       |
|  |  |                                                 | Rehabilitation –repairs, relining or replacement.                                              | As determined by inspections.                      |
|  |  | Table 4 – Geocellular Tank Maintenance Schedule |                                                                                                |                                                    |
|  |  | Maintenance Schedule                            | Required Action                                                                                | Recommended Frequency                              |
|  |  | Regular Maintenance                             | Inspect and identify areas that are not operating correctly. If required, take remedial action | Monthly for 3 months, then annually or as required |
|  |  |                                                 | Remove debris from the catchment surface                                                       | Monthly                                            |
|  |  |                                                 | Remove sediment from pre-treatment structures                                                  | Annually                                           |
|  |  |                                                 |                                                                                                |                                                    |

## 2.2 United Utilities

|   | United Utilities Comment                                                                                                                | Ridge Response                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
|---|-----------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 1 | <i>It is requested that infiltration testing be carried out and evidence provided to prove the viability of infiltration to ground.</i> | <p><b><u>Discharge of Surface Water</u></b></p> <p>In accordance with National Planning Policy Framework (2022) and Building Regulations Approved Document H, disposal of surface water from new developments should follow the hierarchy below:</p> <ol style="list-style-type: none"><li>1. Discharge to ground via infiltration</li><li>2. Discharge to watercourse</li><li>3. Discharge to surface water sewer</li><li>4. Discharge to combined sewer</li></ol> <p>Based on an assessment of local site condition, the hierarchy for surface water disposal at the development site is summarised in Table 2 and in greater detail below:</p> |

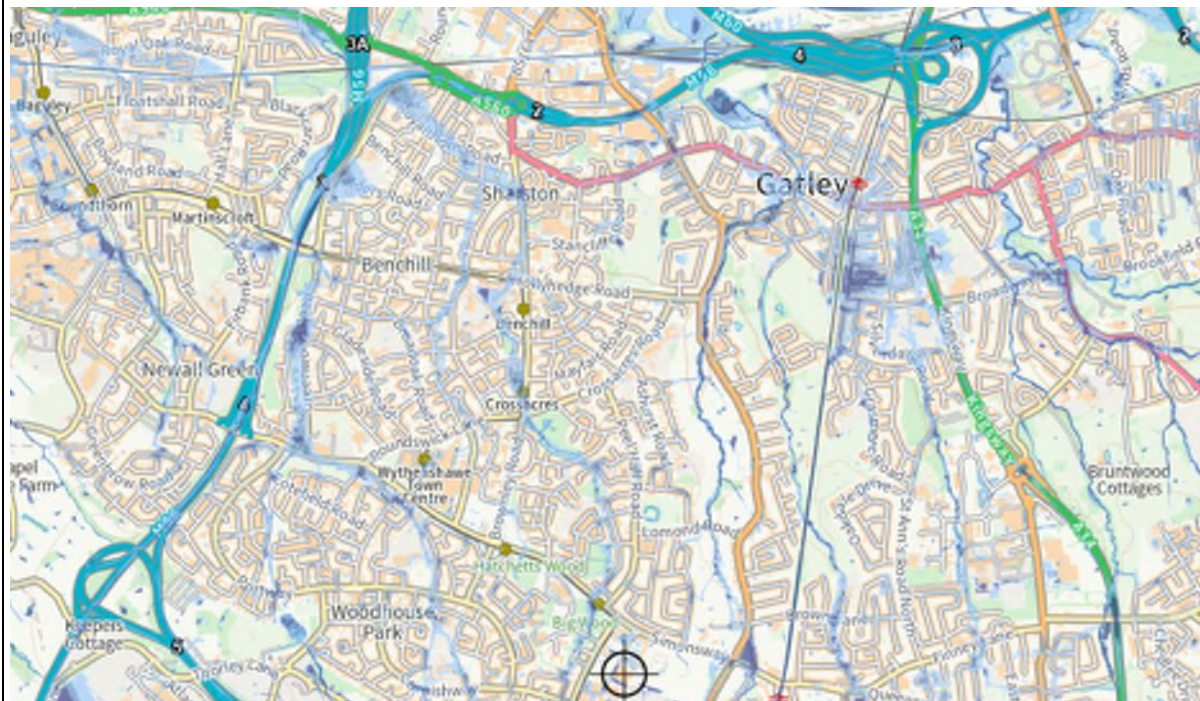
Table 2 – Hierarchy for Surface Water Disposal

| Method                            | Suitability | Suitability for Development                                                                                                                                                                                                                                                                                                    |
|-----------------------------------|-------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Infiltration to Ground            | No          | Based on a desk top assessment of local ground conditions it is believed that infiltration is unlikely to be suitable, however infiltration will be investigated further during the intrusive site investigation works.                                                                                                        |
| Connection to Watercourse         | No          | There are 2 watercourses within 500m of the site. Each of the watercourses already present flood risks to existing settlements. The existing site does not currently drain to either of these watercourses. As such, any new connection to either watercourse has the potential to increase flood risk downstream of the site. |
| Connection to Surface Water Sewer | No          | As the UU SW sewer discharges to the Baguley Brook tributary and the site does not have an existing connection, any new connection to this sewer has the potential to increase flood risk downstream                                                                                                                           |
| Connection to Combined Sewer      | Yes         | The site has been proven to already drain to the combined sewer                                                                                                                                                                                                                                                                |

#### Infiltration

According to the BGS, the site is underlain by Devensian Till superficial deposits, which are classed as a Secondary, undifferentiated Aquifer. The superficial deposits are underlain by, predominantly, Bollin Mudstone formation (Secondary B Aquifer), with a small area of Helsby Sandstone formation (principal Aquifer to the northeast corner of the site).

|  |  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
|--|--|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|  |  | <p>Landis Soilscales describe the soils as slowly permeable, seasonally wet, loamy and clayey with impeded drainage characteristics. Taking this into consideration along with the BGS mapping, at this stage, it is considered extremely unlikely that infiltration is a feasible method of surface water disposal for the proposed development. Infiltration will however be investigated further by means of BRE 365 testing during the intrusive site investigations.</p> <p><b><u>Discharge to Watercourse</u></b></p> <p>There is a Main River (Gatley Brook) 200m east of the site. The main river flows north to the River Mersey and is a mixture of open channel and culverted watercourse.</p> <p>Gatley Brook is a principal flood risk generator within Gatley Town Centre.</p> <p>There is a culverted ordinary watercourse approximately 400m west of the site (a tributary of Baguley Brook). This watercourse is shown as a flood risk generator through Sharston.</p> <p>Figure 3 below demonstrates the downstream flood risk to Gatley and Sharston attributed to the two aforementioned watercourses.</p> |
|--|--|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|



*Figure 3 – GOV.UK Extents of Surface Water Flooding*

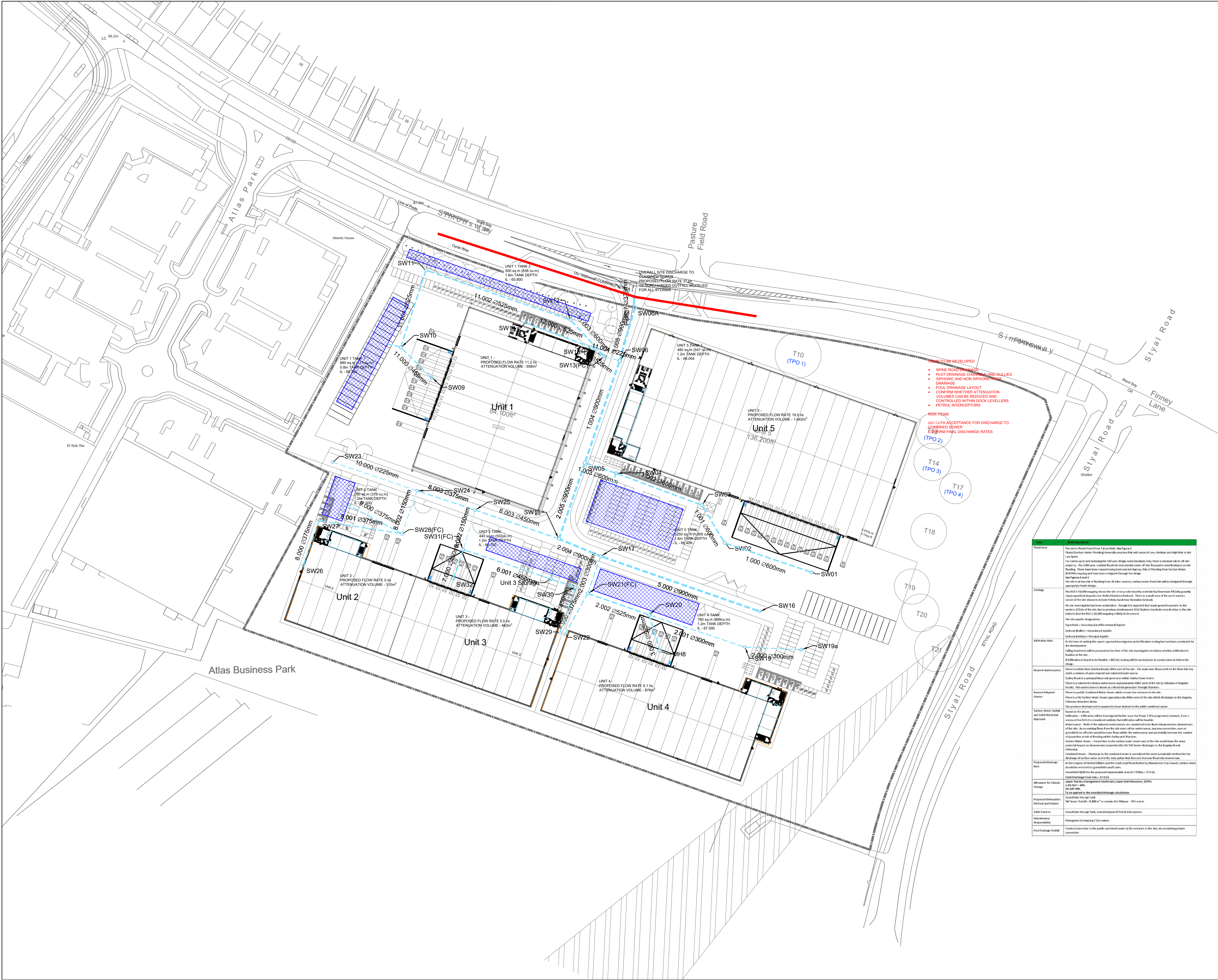
Given that there is already a downstream flood risk to properties in Gatley and Sharston which would only be exacerbated by introducing new surface water flows to the nearby watercourses, we request the LLFA discount discharge to watercourse as a viable method of surface water disposal in order to protect downstream properties.

|   |                                                                                                                                                                                                                      |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
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|   |                                                                                                                                                                                                                      | <p><b><u>Discharge to Surface Water Sewer</u></b></p> <p>As the local surface water sewers in the area ultimately discharge to the watercourses referred to above, a new discharge to surface water sewer would have the same effect as a direct discharge to watercourse, exacerbating the downstream flood risk to properties in Gatley and Sharston. On this basis, discharge to surface water sewer has been discounted as a viable method of surface water disposal for the proposed development.</p> <p><b><u>Discharge to Combined Water Sewer</u></b></p> <p>The existing impermeable areas from the site all have a positive drainage system which is indicated on the GPR survey shown in Figure 2 below. This on site network has a single known point of connection to the public combined sewer. Therefore, discharge to combined sewer is considered the most appropriate and sustainable method of surface water disposal from the proposed development.</p> |
| 2 | <i>It is requested that a new outfall to the watercourse located to the east of the site be considered further and discussed with the LLFA/EA.</i>                                                                   | Please refer to Ridge response to United Utilities comment 1 (above). We are currently awaiting LLFA comments on the assessment, though Ridge believes that any connection to the watercourse would risk an increase in flood risk, contrary to the provisions of the NPPF.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
| 3 | <i>Surface water connection to the combined sewer is a last resort, and there are alternative more sustainable methods of drainage surface water from the site which should be fully investigated and evidenced.</i> | Please refer to Ridge response to United Utilities comment 1 (above). We are currently awaiting LLFA comments on the assessment, though Ridge believes that any connection to the watercourse would risk an increase in flood risk, contrary to the provisions of the NPPF.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
| 4 | <i>If a surface water connection to the combined sewer is agreed, it is requested that this be at greenfield rates.</i>                                                                                              | Current proposals are to restrict surface water flows to a greenfield rate (Qbar) of <b>37 l/s</b> . Prefer to the drainage strategy drawings and calculations contained within <b>Appendix A</b> and <b>Appendix B</b> respectively.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |

### **3. APPENDICES**

- Appendix A – Drainage Strategy Drawings
- Appendix B – Drainage Calculations
- Appendix C – GPR Survey

**APPENDIX A –DRAINAGE STRATEGY DRAWINGS**



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KEY

- EXISTING PUBLIC CWS
- PROPOSED PRIVATE FW DRAIN
- PROPOSED PRIVATE SW DRAIN
- PROPOSED PPIC
- PROPOSED PRECAST CONCRETE MH
- PROPOSED LINEAR DRAINAGE
- PROPOSED LAND DRAINAGE
- FLOW CONTROL (FC)

10 0 10 20 30 40 50

SCALE 1:1000

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|-----------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------|----------|---------------|-------------|-------|---------|------|
| P02                                                                                                                                                             | SURFACE WATER DESIGN AMENDED TO RESTRICT FLOWS TO GREENFIELD RUNOFF RATES | 14.06.23 | LMc           | PB          |       |         |      |
| P01                                                                                                                                                             | PLANNING ISSUE                                                            | 19.10.22 | PB            | LMc         |       |         |      |
| REV                                                                                                                                                             | DESCRIPTION                                                               | DATE     | BY            | CHKD        |       |         |      |
| ORIGINATOR:                                                                                                                                                     |                                                                           |          |               |             |       |         |      |
| <div><div>RIDGE</div><div>5TH FLOOR<br/>BELVEDERE HOUSE<br/>12 BOOTH STREET<br/>MANCHESTER, M2 4AW</div><div>TEL: 0161 833 9579<br/>WWW.RIDGE.CO.UK</div></div> |                                                                           |          |               |             |       |         |      |
| CLIENT:<br>AVIVA                                                                                                                                                |                                                                           |          |               |             |       |         |      |
| IN ASSOCIATION WITH:                                                                                                                                            |                                                                           |          |               |             |       |         |      |
| PROJECT:<br>ATLAS PARK                                                                                                                                          |                                                                           |          |               |             |       |         |      |
| TITLE:<br>SURFACE WATER DRAINAGE<br>STRATEGY DRAWING                                                                                                            |                                                                           |          |               |             |       |         |      |
| ENG/TECH:                                                                                                                                                       | CSE:                                                                      | ICSE:    | SCALE:        | 1:1000 @ A1 |       |         |      |
| AP                                                                                                                                                              | PB                                                                        | PB       | STATUS ISSUE: | S1          |       |         |      |
| STATUS:<br>PRELIMINARY                                                                                                                                          |                                                                           |          |               |             |       |         |      |
| **UNLESS ISSUED FOR CONSTRUCTION - WORKS AT CLIENT/CONTRACTORS RISK**                                                                                           |                                                                           |          |               |             |       |         |      |
| SUITABILITY: SO - Initial Status or WIP                                                                                                                         |                                                                           |          |               |             |       |         |      |
| PROJECT:                                                                                                                                                        | ORG:                                                                      | ZONE:    | LEVEL:        | TYPE:       | ROLE: | NUMBER: | REV: |
| 5017477                                                                                                                                                         | RDG                                                                       | XX       | XX            | DR          | C     | 0500    | P02  |



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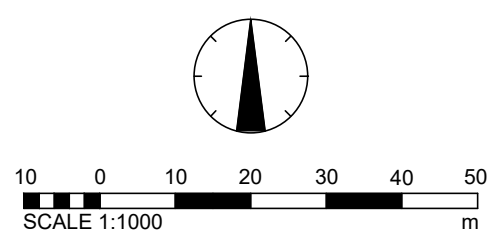
DRAWING NOTES:

CDM REGULATIONS 2015

SIGNIFICANT OR NON-OBVIOUS RISKS AND RISKS WHICH ARE DIFFICULT TO MANAGE ARE IDENTIFIED ON THIS DRAWING USING THE FOLLOWING SYMBOL, IDENTIFIED TO THE RIGHT WITH BRIEF ACCOMPANYING TEXT. FOR FURTHER DETAILS OF THE RISKS IDENTIFIED BY DESIGNERS, REFERENCE SHOULD BE MADE TO CDM HAZARD REGISTER.



| KEY                        |                                 |
|----------------------------|---------------------------------|
|                            | UNIT 1 = 15,940m2 (1.594ha)     |
|                            | UNIT 2 = 5,950m2 (0.595ha)      |
|                            | UNIT 3 = 8,250m2 (0.825ha)      |
|                            | UNIT 4 = 13,440m2 (1.344ha)     |
|                            | UNIT 5 = 22,550m2 (2.255ha)     |
|                            | ACCESS ROAD = 5,850m2 (0.585ha) |
| TOTAL = 71,980m2 (7.198ha) |                                 |



|     |                                                    |          |     |      |
|-----|----------------------------------------------------|----------|-----|------|
| P02 | IMPERMEABLE AREA UPDATED TO SUIT REVISED SITE PLAN | 23.06.23 | LMc | PB   |
| P01 | PRELIMINARY ISSUE                                  | 12.10.22 | AP  | PB   |
| REV | DESCRIPTION                                        | DATE     | BY  | CHKD |



5TH FLOOR  
BELVEDERE HOUSE  
12 BOOTH STREET  
MANCHESTER, M2 4AW

TEL: 0161 833 9579  
WWW.RIDGE.CO.UK

CLIENT:  
**AVIVA**

IN ASSOCIATION WITH:

PROJECT:  
**ATLAS PARK**

TITLE:  
**SURFACE WATER DRAINAGE  
IMPERMEABLE AREA PLAN**

|                                                                       |      |       |               |        |       |         |
|-----------------------------------------------------------------------|------|-------|---------------|--------|-------|---------|
| ENG/TECH:                                                             | CSE: | ICSE: | SCALE:        | 1:1000 | @     | A1      |
| AP                                                                    | PB   | PB    | STATUS ISSUE: | S1     |       |         |
| STATUS:<br><b>PRELIMINARY</b>                                         |      |       |               |        |       |         |
| **UNLESS ISSUED FOR CONSTRUCTION - WORKS AT CLIENT/CONTRACTORS RISK** |      |       |               |        |       |         |
| SUITABILITY: S0 - Initial Status or WIP                               |      |       |               |        |       |         |
| PROJECT:                                                              | ORG: | ZONE: | LEVEL:        | TYPE:  | ROLE: | NUMBER: |
| 5017477                                                               | RDG  | XX    | XX            | DR     | C     | 0520    |
|                                                                       |      |       |               |        |       | REV:    |
|                                                                       |      |       |               |        |       | P02     |

## **APPENDIX B – DRAINAGE CALCULATIONS**

|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |                                               |                                                                                     |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------|-------------------------------------------------------------------------------------|
| Ridge and Partners LLP                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |                                               | Page 1                                                                              |
| The Cowyards<br>Blenheim Park, Oxford Road<br>Woodstock OX20 1QR                                                                                                                                                                                                                                                                                                                                                                                                                                          | Atlas Business Park<br>Greenfied Runoff Rates |  |
| Date 13/06/2023<br>File                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | Designed by LMc<br>Checked by PB              |                                                                                     |
| Innovyze                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |                                               | Source Control 2020.1                                                               |
| <p style="text-align: center;"><u>ICP SUDS Mean Annual Flood</u></p> <p style="text-align: center;">Input</p> <p>Return Period (years)      1                      Soil              0.450<br/> Area (ha) 7.198                      Urban              0.000<br/> SAAR (mm)      800 Region Number Region 10</p> <p style="text-align: center;"><b>Results      l/s</b></p> <p>QBAR Rural 37.0<br/> QBAR Urban 37.0</p> <p>Q1 year 32.2</p> <p>Q1 year 32.2<br/> Q30 years 62.7<br/> Q100 years 76.9</p> |                                               |                                                                                     |
| ©1982-2020 Innovyze                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |                                               |                                                                                     |







## STORM SEWER DESIGN by the Modified Rational Method

| PN    | Length<br>(m) | Fall<br>(m) | Slope<br>(1:X) | I.Area<br>(ha) | T.E.<br>(mins) | Base<br>Flow (l/s) | k<br>(mm) | HYD<br>SECT | DIA<br>(mm) | Section      | Type | Auto<br>Design                                                                      |
|-------|---------------|-------------|----------------|----------------|----------------|--------------------|-----------|-------------|-------------|--------------|------|-------------------------------------------------------------------------------------|
| 6.002 | 23.626        | 0.091       | 259.6          | 0.000          | 0.00           | 0.0                | 0.600     | o           | 150         | Pipe/Conduit |      |  |
| 8.000 | 27.045        | 0.100       | 270.5          | 0.357          | 15.00          | 0.0                | 0.600     | o           | 375         | Pipe/Conduit |      |  |
| 8.001 | 48.045        | 0.734       | 65.5           | 0.108          | 0.00           | 0.0                | 0.600     | o           | 375         | Pipe/Conduit |      |  |
| 9.000 | 35.262        | 0.143       | 246.6          | 0.000          | 15.00          | 0.0                | 0.600     | o           | 375         | Pipe/Conduit |      |  |
| 8.002 | 26.114        | 0.134       | 194.9          | 0.122          | 0.00           | 0.0                | 0.600     | o           | 150         | Pipe/Conduit |      |  |

### Network Results Table

| PN    | Rain<br>(mm/hr) | T.C.<br>(mins) | US/IL<br>(m) | Σ I.Area<br>(ha) | Σ Base<br>Flow (l/s) | Foul<br>(l/s) | Add Flow<br>(l/s) | Vel<br>(m/s) | Cap<br>(l/s) | Flow  |
|-------|-----------------|----------------|--------------|------------------|----------------------|---------------|-------------------|--------------|--------------|-------|
| 6.002 | 83.10           | 16.32          | 66.562       | 0.805            | 0.0                  | 0.0           | 81.5              | 0.62         | 10.9«        | 262.7 |
| 8.000 | 85.83           | 15.41          | 67.679       | 0.357            | 0.0                  | 0.0           | 37.3              | 1.10         | 121.1        | 120.3 |
| 8.001 | 84.73           | 15.77          | 67.579       | 0.465            | 0.0                  | 0.0           | 48.0              | 2.24         | 247.7        | 154.7 |
| 9.000 | 85.52           | 15.51          | 67.000       | 0.000            | 0.0                  | 0.0           | 0.0               | 1.15         | 126.9        | 0.0   |
| 8.002 | 82.94           | 16.38          | 66.845       | 0.587            | 0.0                  | 0.0           | 59.3              | 0.72         | 12.7«        | 191.2 |

STORM SEWER DESIGN by the Modified Rational Method

| PN     | Length<br>(m) | Fall<br>(m) | Slope<br>(1:X) | I.Area<br>(ha) | T.E.<br>(mins) | Base<br>Flow (l/s) | k<br>(mm) | HYD<br>SECT | DIA<br>(mm) | Section      | Type | Auto<br>Design                                                                      |
|--------|---------------|-------------|----------------|----------------|----------------|--------------------|-----------|-------------|-------------|--------------|------|-------------------------------------------------------------------------------------|
| 10.000 | 51.007        | 0.304       | 167.8          | 0.038          | 15.00          | 0.0                | 0.600     | o           | 225         | Pipe/Conduit |      |  |
| 8.003  | 35.033        | 0.240       | 146.0          | 0.098          | 0.00           | 0.0                | 0.600     | o           | 375         | Pipe/Conduit |      |  |
| 6.003  | 50.813        | 0.138       | 368.2          | 0.098          | 0.00           | 0.0                | 0.600     | o           | 450         | Pipe/Conduit |      |  |
| 2.005  | 46.008        | 0.081       | 568.0          | 0.000          | 0.00           | 0.0                | 0.600     | o           | 900         | Pipe/Conduit |      |  |
| 1.004  | 61.660        | 0.604       | 102.1          | 0.176          | 0.00           | 0.0                | 0.600     | o           | 900         | Pipe/Conduit |      |  |

| PN     | Rain<br>(mm/hr) | T.C.<br>(mins) | US/IL<br>(m) | Σ I.Area<br>(ha) | Σ Base<br>Flow (l/s) | Foul<br>(l/s) | Add Flow<br>(l/s) | Vel<br>(m/s) | Cap<br>(l/s) | Flow<br>(l/s) |
|--------|-----------------|----------------|--------------|------------------|----------------------|---------------|-------------------|--------------|--------------|---------------|
| 10.000 | 84.50           | 15.84          | 67.015       | 0.038            | 0.0                  | 0.0           | 3.9               | 1.01         | 40.0         | 12.6          |
| 8.003  | 81.84           | 16.77          | 66.711       | 0.723            | 0.0                  | 0.0           | 72.1              | 1.50         | 165.4«       | 232.4         |
| 6.003  | 79.67           | 17.57          | 66.471       | 1.626            | 0.0                  | 0.0           | 157.9             | 1.05         | 167.6«       | 508.7         |
| 2.005  | 77.89           | 18.27          | 65.958       | 3.127            | 0.0                  | 0.0           | 296.8             | 1.31         | 831.8«       | 956.5         |
| 1.004  | 77.08           | 18.60          | 65.877       | 5.549            | 0.0                  | 0.0           | 521.3             | 3.10         | 1973.0       | 1679.6        |

STORM SEWER DESIGN by the Modified Rational Method

Network Design Table for 1.000

| PN     | Length<br>(m) | Fall<br>(m) | Slope<br>(1:X) | I.Area<br>(ha) | T.E.<br>(mins) | Base<br>Flow (l/s) | k<br>(mm) | HYD<br>SECT | DIA<br>(mm) | Section Type | Auto<br>Design                                                                      |
|--------|---------------|-------------|----------------|----------------|----------------|--------------------|-----------|-------------|-------------|--------------|-------------------------------------------------------------------------------------|
| 11.000 | 24.757        | 0.423       | 58.5           | 0.000          | 15.00          | 0.0                | 0.600     | o           | 450         | Pipe/Conduit |  |
| 11.001 | 46.510        | 0.134       | 347.1          | 0.524          | 0.00           | 0.0                | 0.600     | o           | 450         | Pipe/Conduit |  |
| 11.002 | 87.588        | 0.252       | 347.6          | 0.271          | 0.00           | 0.0                | 0.600     | o           | 450         | Pipe/Conduit |  |
| 11.003 | 28.464        | 0.316       | 90.1           | 0.000          | 0.00           | 0.0                | 0.600     | o           | 450         | Pipe/Conduit |  |
| 12.000 | 40.186        | 0.161       | 249.6          | 0.854          | 15.00          | 0.0                | 0.600     | o           | 525         | Pipe/Conduit |  |
| 12.001 | 8.980         | 1.674       | 5.4            | 0.000          | 0.00           | 0.0                | 0.600     | o           | 525         | Pipe/Conduit |  |

### Network Results Table

| PN     | Rain<br>(mm/hr) | T.C.<br>(mins) | US/IL<br>(m) | Σ I.A. Area<br>(ha) | Σ Base<br>Flow (l/s) | Foul<br>(l/s) | Add Flow<br>(l/s) | Vel<br>(m/s) | Cap<br>(l/s) | Flow<br>(l/s) |
|--------|-----------------|----------------|--------------|---------------------|----------------------|---------------|-------------------|--------------|--------------|---------------|
| 11.000 | 86.64           | 15.16          | 66.750       | 0.000               | 0.0                  | 0.0           | 0.0               | 2.66         | 423.3        | 0.0           |
| 11.001 | 84.43           | 15.87          | 66.327       | 0.524               | 0.0                  | 0.0           | 53.9              | 1.09         | 172.6«       | 173.7         |
| 11.002 | 80.61           | 17.21          | 66.193       | 0.795               | 0.0                  | 0.0           | 78.1              | 1.08         | 172.5«       | 251.7         |
| 11.003 | 80.02           | 17.44          | 65.941       | 0.795               | 0.0                  | 0.0           | 78.1              | 2.14         | 340.8        | 251.7         |
| 12.000 | 85.63           | 15.47          | 67.460       | 0.854               | 0.0                  | 0.0           | 89.1              | 1.41         | 305.9        | 287.2         |
| 12.001 | 85.59           | 15.49          | 67.299       | 0.854               | 0.0                  | 0.0           | 89.1              | 9.71         | 2103.0       | 287.2         |

STORM SEWER DESIGN by the Modified Rational Method

| PN     | Length<br>(m) | Fall<br>(m) | Slope<br>(1:X) | I.Area<br>(ha) | T.E.<br>(mins) | Base<br>Flow (l/s) | k<br>(mm) | HYD<br>SECT | DIA<br>(mm) | Section Type | Auto<br>Design                                                                      |
|--------|---------------|-------------|----------------|----------------|----------------|--------------------|-----------|-------------|-------------|--------------|-------------------------------------------------------------------------------------|
| 11.004 | 9.110         | 0.352       | 25.9           | 0.000          | 0.00           | 0.0                | 0.600     | o           | 525         | Pipe/Conduit |  |
| 1.005  | 31.744        | 0.063       | 503.9          | 0.000          | 0.00           | 0.0                | 0.600     | o           | 900         | Pipe/Conduit |  |
| 1.006  | 6.000         | 0.020       | 300.0          | 0.000          | 0.00           | 0.0                | 0.600     | o           | 375         | Pipe/Conduit |  |

Surcharged Outfall Details for 1.000

|                       |
|-----------------------|
| Atlas Park            |
| Proposed SW           |
| Drainage Calculations |



Micro  
Drainage

|                 |
|-----------------|
| Designed by LMc |
| Checked by PB   |

---

Network 2020.1

Surcharged Outfall Details for 1.000

Datum (m) 65.190 Offset (mins) 0

| Time<br>(mins) | Depth<br>(m) | Time<br>(mins) | Depth<br>(m) | Time<br>(mins) | Depth<br>(m) | Time<br>(mins) | Depth<br>(m) | Time<br>(mins) | Depth<br>(m) | Time<br>(mins) | Depth<br>(m) | Time<br>(mins) | Depth<br>(m) | Time<br>(mins) | Depth<br>(m) | Time<br>(mins) | Depth<br>(m) |
|----------------|--------------|----------------|--------------|----------------|--------------|----------------|--------------|----------------|--------------|----------------|--------------|----------------|--------------|----------------|--------------|----------------|--------------|
| 15             | 1.000        | 165            | 1.000        | 315            | 1.000        | 465            | 1.000        | 615            | 1.000        | 765            | 1.000        | 915            | 1.000        | 1065           | 1.000        | 1215           | 1.000        |
| 30             | 1.000        | 180            | 1.000        | 330            | 1.000        | 480            | 1.000        | 630            | 1.000        | 780            | 1.000        | 930            | 1.000        | 1080           | 1.000        | 1230           | 1.000        |
| 45             | 1.000        | 195            | 1.000        | 345            | 1.000        | 495            | 1.000        | 645            | 1.000        | 795            | 1.000        | 945            | 1.000        | 1095           | 1.000        | 1245           | 1.000        |
| 60             | 1.000        | 210            | 1.000        | 360            | 1.000        | 510            | 1.000        | 660            | 1.000        | 810            | 1.000        | 960            | 1.000        | 1110           | 1.000        | 1260           | 1.000        |
| 75             | 1.000        | 225            | 1.000        | 375            | 1.000        | 525            | 1.000        | 675            | 1.000        | 825            | 1.000        | 975            | 1.000        | 1125           | 1.000        | 1275           | 1.000        |
| 90             | 1.000        | 240            | 1.000        | 390            | 1.000        | 540            | 1.000        | 690            | 1.000        | 840            | 1.000        | 990            | 1.000        | 1140           | 1.000        | 1290           | 1.000        |
| 105            | 1.000        | 255            | 1.000        | 405            | 1.000        | 555            | 1.000        | 705            | 1.000        | 855            | 1.000        | 1005           | 1.000        | 1155           | 1.000        | 1305           | 1.000        |
| 120            | 1.000        | 270            | 1.000        | 420            | 1.000        | 570            | 1.000        | 720            | 1.000        | 870            | 1.000        | 1020           | 1.000        | 1170           | 1.000        | 1320           | 1.000        |
| 135            | 1.000        | 285            | 1.000        | 435            | 1.000        | 585            | 1.000        | 735            | 1.000        | 885            | 1.000        | 1035           | 1.000        | 1185           | 1.000        | 1335           | 1.000        |
| 150            | 1.000        | 300            | 1.000        | 450            | 1.000        | 600            | 1.000        | 750            | 1.000        | 900            | 1.000        | 1050           | 1.000        | 1200           | 1.000        | 1350           | 1.000        |

|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |                                                    |                                                                                     |                           |                            |                   |                       |                   |                   |                           |                   |                   |                   |                  |                   |            |            |                                   |                           |           |                           |                                 |      |             |         |       |      |       |     |       |     |       |     |       |      |       |      |       |      |       |     |       |     |       |     |       |      |       |      |       |      |       |     |       |     |       |     |       |      |       |      |       |      |       |     |       |     |       |     |       |      |       |      |       |      |
|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------|-------------------------------------------------------------------------------------|---------------------------|----------------------------|-------------------|-----------------------|-------------------|-------------------|---------------------------|-------------------|-------------------|-------------------|------------------|-------------------|------------|------------|-----------------------------------|---------------------------|-----------|---------------------------|---------------------------------|------|-------------|---------|-------|------|-------|-----|-------|-----|-------|-----|-------|------|-------|------|-------|------|-------|-----|-------|-----|-------|-----|-------|------|-------|------|-------|------|-------|-----|-------|-----|-------|-----|-------|------|-------|------|-------|------|-------|-----|-------|-----|-------|-----|-------|------|-------|------|-------|------|
| Ridge and Partners LLP                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |                                                    | Page 9                                                                              |                           |                            |                   |                       |                   |                   |                           |                   |                   |                   |                  |                   |            |            |                                   |                           |           |                           |                                 |      |             |         |       |      |       |     |       |     |       |     |       |      |       |      |       |      |       |     |       |     |       |     |       |      |       |      |       |      |       |     |       |     |       |     |       |      |       |      |       |      |       |     |       |     |       |     |       |      |       |      |       |      |
| The Cowyards<br>Blenheim Park, Oxford Road<br>Woodstock OX20 1QR                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | Atlas Park<br>Proposed SW<br>Drainage Calculations |  |                           |                            |                   |                       |                   |                   |                           |                   |                   |                   |                  |                   |            |            |                                   |                           |           |                           |                                 |      |             |         |       |      |       |     |       |     |       |     |       |      |       |      |       |      |       |     |       |     |       |     |       |      |       |      |       |      |       |     |       |     |       |     |       |      |       |      |       |      |       |     |       |     |       |     |       |      |       |      |       |      |
| Date 14/06/2023<br>File Proposed SW Network GFRO.MDX                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | Designed by LMc<br>Checked by PB                   |                                                                                     |                           |                            |                   |                       |                   |                   |                           |                   |                   |                   |                  |                   |            |            |                                   |                           |           |                           |                                 |      |             |         |       |      |       |     |       |     |       |     |       |      |       |      |       |      |       |     |       |     |       |     |       |      |       |      |       |      |       |     |       |     |       |     |       |      |       |      |       |      |       |     |       |     |       |     |       |      |       |      |       |      |
| Innovyze                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | Network 2020.1                                     |                                                                                     |                           |                            |                   |                       |                   |                   |                           |                   |                   |                   |                  |                   |            |            |                                   |                           |           |                           |                                 |      |             |         |       |      |       |     |       |     |       |     |       |      |       |      |       |      |       |     |       |     |       |     |       |      |       |      |       |      |       |     |       |     |       |     |       |      |       |      |       |      |       |     |       |     |       |     |       |      |       |      |       |      |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |                                                    |                                                                                     |                           |                            |                   |                       |                   |                   |                           |                   |                   |                   |                  |                   |            |            |                                   |                           |           |                           |                                 |      |             |         |       |      |       |     |       |     |       |     |       |      |       |      |       |      |       |     |       |     |       |     |       |      |       |      |       |      |       |     |       |     |       |     |       |      |       |      |       |      |       |     |       |     |       |     |       |      |       |      |       |      |
| <u>Online Controls for 1.000</u>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |                                                    |                                                                                     |                           |                            |                   |                       |                   |                   |                           |                   |                   |                   |                  |                   |            |            |                                   |                           |           |                           |                                 |      |             |         |       |      |       |     |       |     |       |     |       |      |       |      |       |      |       |     |       |     |       |     |       |      |       |      |       |      |       |     |       |     |       |     |       |      |       |      |       |      |       |     |       |     |       |     |       |      |       |      |       |      |
| <u>Hydro-Brake® Optimum Manhole: 4, DS/PN: 1.003, Volume (m³): 18.2</u>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |                                                    |                                                                                     |                           |                            |                   |                       |                   |                   |                           |                   |                   |                   |                  |                   |            |            |                                   |                           |           |                           |                                 |      |             |         |       |      |       |     |       |     |       |     |       |      |       |      |       |      |       |     |       |     |       |     |       |      |       |      |       |      |       |     |       |     |       |     |       |      |       |      |       |      |       |     |       |     |       |     |       |      |       |      |       |      |
| <table><tr><td>Unit Reference</td><td>MD-SHE-0123-8000-1600-8000</td><td>Sump Available</td><td>Yes</td></tr><tr><td>Design Head (m)</td><td>1.600</td><td>Diameter (mm)</td><td>123</td></tr><tr><td>Design Flow (l/s)</td><td>8.0</td><td>Invert Level (m)</td><td>66.290</td></tr><tr><td>Flush-Flo™</td><td>Calculated</td><td>Minimum Outlet Pipe Diameter (mm)</td><td>150</td></tr><tr><td>Objective</td><td>Minimise upstream storage</td><td>Suggested Manhole Diameter (mm)</td><td>1200</td></tr><tr><td>Application</td><td>Surface</td><td></td><td></td></tr></table>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |                                                    |                                                                                     | Unit Reference            | MD-SHE-0123-8000-1600-8000 | Sump Available    | Yes                   | Design Head (m)   | 1.600             | Diameter (mm)             | 123               | Design Flow (l/s) | 8.0               | Invert Level (m) | 66.290            | Flush-Flo™ | Calculated | Minimum Outlet Pipe Diameter (mm) | 150                       | Objective | Minimise upstream storage | Suggested Manhole Diameter (mm) | 1200 | Application | Surface |       |      |       |     |       |     |       |     |       |      |       |      |       |      |       |     |       |     |       |     |       |      |       |      |       |      |       |     |       |     |       |     |       |      |       |      |       |      |       |     |       |     |       |     |       |      |       |      |       |      |
| Unit Reference                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | MD-SHE-0123-8000-1600-8000                         | Sump Available                                                                      | Yes                       |                            |                   |                       |                   |                   |                           |                   |                   |                   |                  |                   |            |            |                                   |                           |           |                           |                                 |      |             |         |       |      |       |     |       |     |       |     |       |      |       |      |       |      |       |     |       |     |       |     |       |      |       |      |       |      |       |     |       |     |       |     |       |      |       |      |       |      |       |     |       |     |       |     |       |      |       |      |       |      |
| Design Head (m)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | 1.600                                              | Diameter (mm)                                                                       | 123                       |                            |                   |                       |                   |                   |                           |                   |                   |                   |                  |                   |            |            |                                   |                           |           |                           |                                 |      |             |         |       |      |       |     |       |     |       |     |       |      |       |      |       |      |       |     |       |     |       |     |       |      |       |      |       |      |       |     |       |     |       |     |       |      |       |      |       |      |       |     |       |     |       |     |       |      |       |      |       |      |
| Design Flow (l/s)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | 8.0                                                | Invert Level (m)                                                                    | 66.290                    |                            |                   |                       |                   |                   |                           |                   |                   |                   |                  |                   |            |            |                                   |                           |           |                           |                                 |      |             |         |       |      |       |     |       |     |       |     |       |      |       |      |       |      |       |     |       |     |       |     |       |      |       |      |       |      |       |     |       |     |       |     |       |      |       |      |       |      |       |     |       |     |       |     |       |      |       |      |       |      |
| Flush-Flo™                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | Calculated                                         | Minimum Outlet Pipe Diameter (mm)                                                   | 150                       |                            |                   |                       |                   |                   |                           |                   |                   |                   |                  |                   |            |            |                                   |                           |           |                           |                                 |      |             |         |       |      |       |     |       |     |       |     |       |      |       |      |       |      |       |     |       |     |       |     |       |      |       |      |       |      |       |     |       |     |       |     |       |      |       |      |       |      |       |     |       |     |       |     |       |      |       |      |       |      |
| Objective                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | Minimise upstream storage                          | Suggested Manhole Diameter (mm)                                                     | 1200                      |                            |                   |                       |                   |                   |                           |                   |                   |                   |                  |                   |            |            |                                   |                           |           |                           |                                 |      |             |         |       |      |       |     |       |     |       |     |       |      |       |      |       |      |       |     |       |     |       |     |       |      |       |      |       |      |       |     |       |     |       |     |       |      |       |      |       |      |       |     |       |     |       |     |       |      |       |      |       |      |
| Application                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | Surface                                            |                                                                                     |                           |                            |                   |                       |                   |                   |                           |                   |                   |                   |                  |                   |            |            |                                   |                           |           |                           |                                 |      |             |         |       |      |       |     |       |     |       |     |       |      |       |      |       |      |       |     |       |     |       |     |       |      |       |      |       |      |       |     |       |     |       |     |       |      |       |      |       |      |       |     |       |     |       |     |       |      |       |      |       |      |
| <table><tr><td><b>Control Points</b></td><td><b>Head (m)</b></td><td><b>Flow (l/s)</b></td><td><b>Control Points</b></td><td><b>Head (m)</b></td><td><b>Flow (l/s)</b></td></tr><tr><td>Design Point (Calculated)</td><td>1.600</td><td>8.0</td><td>Kick-Flo®</td><td>0.977</td><td>6.4</td></tr><tr><td>Flush-Flo™</td><td>0.471</td><td>8.0</td><td>Mean Flow over Head Range</td><td>-</td><td>7.0</td></tr></table>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |                                                    |                                                                                     | <b>Control Points</b>     | <b>Head (m)</b>            | <b>Flow (l/s)</b> | <b>Control Points</b> | <b>Head (m)</b>   | <b>Flow (l/s)</b> | Design Point (Calculated) | 1.600             | 8.0               | Kick-Flo®         | 0.977            | 6.4               | Flush-Flo™ | 0.471      | 8.0                               | Mean Flow over Head Range | -         | 7.0                       |                                 |      |             |         |       |      |       |     |       |     |       |     |       |      |       |      |       |      |       |     |       |     |       |     |       |      |       |      |       |      |       |     |       |     |       |     |       |      |       |      |       |      |       |     |       |     |       |     |       |      |       |      |       |      |
| <b>Control Points</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | <b>Head (m)</b>                                    | <b>Flow (l/s)</b>                                                                   | <b>Control Points</b>     | <b>Head (m)</b>            | <b>Flow (l/s)</b> |                       |                   |                   |                           |                   |                   |                   |                  |                   |            |            |                                   |                           |           |                           |                                 |      |             |         |       |      |       |     |       |     |       |     |       |      |       |      |       |      |       |     |       |     |       |     |       |      |       |      |       |      |       |     |       |     |       |     |       |      |       |      |       |      |       |     |       |     |       |     |       |      |       |      |       |      |
| Design Point (Calculated)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | 1.600                                              | 8.0                                                                                 | Kick-Flo®                 | 0.977                      | 6.4               |                       |                   |                   |                           |                   |                   |                   |                  |                   |            |            |                                   |                           |           |                           |                                 |      |             |         |       |      |       |     |       |     |       |     |       |      |       |      |       |      |       |     |       |     |       |     |       |      |       |      |       |      |       |     |       |     |       |     |       |      |       |      |       |      |       |     |       |     |       |     |       |      |       |      |       |      |
| Flush-Flo™                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | 0.471                                              | 8.0                                                                                 | Mean Flow over Head Range | -                          | 7.0               |                       |                   |                   |                           |                   |                   |                   |                  |                   |            |            |                                   |                           |           |                           |                                 |      |             |         |       |      |       |     |       |     |       |     |       |      |       |      |       |      |       |     |       |     |       |     |       |      |       |      |       |      |       |     |       |     |       |     |       |      |       |      |       |      |       |     |       |     |       |     |       |      |       |      |       |      |
| The hydrological calculations have been based on the Head/Discharge relationship for the Hydro-Brake® Optimum as specified. Should another type of control device other than a Hydro-Brake Optimum® be utilised then these storage routing calculations will be invalidated                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |                                                    |                                                                                     |                           |                            |                   |                       |                   |                   |                           |                   |                   |                   |                  |                   |            |            |                                   |                           |           |                           |                                 |      |             |         |       |      |       |     |       |     |       |     |       |      |       |      |       |      |       |     |       |     |       |     |       |      |       |      |       |      |       |     |       |     |       |     |       |      |       |      |       |      |       |     |       |     |       |     |       |      |       |      |       |      |
| <table><tr><td><b>Depth (m)</b></td><td><b>Flow (l/s)</b></td><td><b>Depth (m)</b></td><td><b>Flow (l/s)</b></td><td><b>Depth (m)</b></td><td><b>Flow (l/s)</b></td><td><b>Depth (m)</b></td><td><b>Flow (l/s)</b></td><td><b>Depth (m)</b></td><td><b>Flow (l/s)</b></td><td><b>Depth (m)</b></td><td><b>Flow (l/s)</b></td></tr><tr><td>0.100</td><td>4.4</td><td>0.600</td><td>7.9</td><td>1.600</td><td>8.0</td><td>2.600</td><td>10.1</td><td>5.000</td><td>13.7</td><td>7.500</td><td>16.6</td></tr><tr><td>0.200</td><td>7.1</td><td>0.800</td><td>7.5</td><td>1.800</td><td>8.5</td><td>3.000</td><td>10.8</td><td>5.500</td><td>14.4</td><td>8.000</td><td>17.2</td></tr><tr><td>0.300</td><td>7.7</td><td>1.000</td><td>6.4</td><td>2.000</td><td>8.9</td><td>3.500</td><td>11.6</td><td>6.000</td><td>15.0</td><td>8.500</td><td>17.7</td></tr><tr><td>0.400</td><td>8.0</td><td>1.200</td><td>7.0</td><td>2.200</td><td>9.3</td><td>4.000</td><td>12.3</td><td>6.500</td><td>15.5</td><td>9.000</td><td>18.2</td></tr><tr><td>0.500</td><td>8.0</td><td>1.400</td><td>7.5</td><td>2.400</td><td>9.7</td><td>4.500</td><td>13.0</td><td>7.000</td><td>16.1</td><td>9.500</td><td>18.6</td></tr></table> |                                                    |                                                                                     | <b>Depth (m)</b>          | <b>Flow (l/s)</b>          | <b>Depth (m)</b>  | <b>Flow (l/s)</b>     | <b>Depth (m)</b>  | <b>Flow (l/s)</b> | <b>Depth (m)</b>          | <b>Flow (l/s)</b> | <b>Depth (m)</b>  | <b>Flow (l/s)</b> | <b>Depth (m)</b> | <b>Flow (l/s)</b> | 0.100      | 4.4        | 0.600                             | 7.9                       | 1.600     | 8.0                       | 2.600                           | 10.1 | 5.000       | 13.7    | 7.500 | 16.6 | 0.200 | 7.1 | 0.800 | 7.5 | 1.800 | 8.5 | 3.000 | 10.8 | 5.500 | 14.4 | 8.000 | 17.2 | 0.300 | 7.7 | 1.000 | 6.4 | 2.000 | 8.9 | 3.500 | 11.6 | 6.000 | 15.0 | 8.500 | 17.7 | 0.400 | 8.0 | 1.200 | 7.0 | 2.200 | 9.3 | 4.000 | 12.3 | 6.500 | 15.5 | 9.000 | 18.2 | 0.500 | 8.0 | 1.400 | 7.5 | 2.400 | 9.7 | 4.500 | 13.0 | 7.000 | 16.1 | 9.500 | 18.6 |
| <b>Depth (m)</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | <b>Flow (l/s)</b>                                  | <b>Depth (m)</b>                                                                    | <b>Flow (l/s)</b>         | <b>Depth (m)</b>           | <b>Flow (l/s)</b> | <b>Depth (m)</b>      | <b>Flow (l/s)</b> | <b>Depth (m)</b>  | <b>Flow (l/s)</b>         | <b>Depth (m)</b>  | <b>Flow (l/s)</b> |                   |                  |                   |            |            |                                   |                           |           |                           |                                 |      |             |         |       |      |       |     |       |     |       |     |       |      |       |      |       |      |       |     |       |     |       |     |       |      |       |      |       |      |       |     |       |     |       |     |       |      |       |      |       |      |       |     |       |     |       |     |       |      |       |      |       |      |
| 0.100                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | 4.4                                                | 0.600                                                                               | 7.9                       | 1.600                      | 8.0               | 2.600                 | 10.1              | 5.000             | 13.7                      | 7.500             | 16.6              |                   |                  |                   |            |            |                                   |                           |           |                           |                                 |      |             |         |       |      |       |     |       |     |       |     |       |      |       |      |       |      |       |     |       |     |       |     |       |      |       |      |       |      |       |     |       |     |       |     |       |      |       |      |       |      |       |     |       |     |       |     |       |      |       |      |       |      |
| 0.200                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | 7.1                                                | 0.800                                                                               | 7.5                       | 1.800                      | 8.5               | 3.000                 | 10.8              | 5.500             | 14.4                      | 8.000             | 17.2              |                   |                  |                   |            |            |                                   |                           |           |                           |                                 |      |             |         |       |      |       |     |       |     |       |     |       |      |       |      |       |      |       |     |       |     |       |     |       |      |       |      |       |      |       |     |       |     |       |     |       |      |       |      |       |      |       |     |       |     |       |     |       |      |       |      |       |      |
| 0.300                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | 7.7                                                | 1.000                                                                               | 6.4                       | 2.000                      | 8.9               | 3.500                 | 11.6              | 6.000             | 15.0                      | 8.500             | 17.7              |                   |                  |                   |            |            |                                   |                           |           |                           |                                 |      |             |         |       |      |       |     |       |     |       |     |       |      |       |      |       |      |       |     |       |     |       |     |       |      |       |      |       |      |       |     |       |     |       |     |       |      |       |      |       |      |       |     |       |     |       |     |       |      |       |      |       |      |
| 0.400                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | 8.0                                                | 1.200                                                                               | 7.0                       | 2.200                      | 9.3               | 4.000                 | 12.3              | 6.500             | 15.5                      | 9.000             | 18.2              |                   |                  |                   |            |            |                                   |                           |           |                           |                                 |      |             |         |       |      |       |     |       |     |       |     |       |      |       |      |       |      |       |     |       |     |       |     |       |      |       |      |       |      |       |     |       |     |       |     |       |      |       |      |       |      |       |     |       |     |       |     |       |      |       |      |       |      |
| 0.500                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | 8.0                                                | 1.400                                                                               | 7.5                       | 2.400                      | 9.7               | 4.500                 | 13.0              | 7.000             | 16.1                      | 9.500             | 18.6              |                   |                  |                   |            |            |                                   |                           |           |                           |                                 |      |             |         |       |      |       |     |       |     |       |     |       |      |       |      |       |      |       |     |       |     |       |     |       |      |       |      |       |      |       |     |       |     |       |     |       |      |       |      |       |      |       |     |       |     |       |     |       |      |       |      |       |      |
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|                                                                  |  |                                                    |  |
|------------------------------------------------------------------|--|----------------------------------------------------|--|
| Ridge and Partners LLP                                           |  | Page 10                                            |  |
| The Cowyards<br>Blenheim Park, Oxford Road<br>Woodstock OX20 1QR |  | Atlas Park<br>Proposed SW<br>Drainage Calculations |  |
| Date 14/06/2023<br>File Proposed SW Network GFRO.MDX             |  | Designed by LMc<br>Checked by PB                   |  |
| Innovyze                                                         |  | Network 2020.1                                     |  |

Hydro-Brake® Optimum Manhole: 10, DS/PN: 2.003, Volume (m³): 14.5

|                   |                            |                                   |        |
|-------------------|----------------------------|-----------------------------------|--------|
| Unit Reference    | MD-SHE-0100-5000-1400-5000 | Sump Available                    | Yes    |
| Design Head (m)   | 1.400                      | Diameter (mm)                     | 100    |
| Design Flow (l/s) | 5.0                        | Invert Level (m)                  | 66.835 |
| Flush-Flo™        | Calculated                 | Minimum Outlet Pipe Diameter (mm) | 150    |
| Objective         | Minimise upstream storage  | Suggested Manhole Diameter (mm)   | 1200   |
| Application       | Surface                    |                                   |        |

|                           |                 |                   |                           |                 |                   |
|---------------------------|-----------------|-------------------|---------------------------|-----------------|-------------------|
| <b>Control Points</b>     | <b>Head (m)</b> | <b>Flow (l/s)</b> | <b>Control Points</b>     | <b>Head (m)</b> | <b>Flow (l/s)</b> |
| Design Point (Calculated) | 1.400           | 5.0               | Kick-Flo®                 | 0.855           | 4.0               |
| Flush-Flo™                | 0.416           | 5.0               | Mean Flow over Head Range | -               | 4.4               |

The hydrological calculations have been based on the Head/Discharge relationship for the Hydro-Brake® Optimum as specified. Should another type of control device other than a Hydro-Brake Optimum® be utilised then these storage routing calculations will be invalidated

|                  |                   |                  |                   |                  |                   |                  |                   |                  |                   |                  |                   |
|------------------|-------------------|------------------|-------------------|------------------|-------------------|------------------|-------------------|------------------|-------------------|------------------|-------------------|
| <b>Depth (m)</b> | <b>Flow (l/s)</b> | <b>Depth (m)</b> | <b>Flow (l/s)</b> | <b>Depth (m)</b> | <b>Flow (l/s)</b> | <b>Depth (m)</b> | <b>Flow (l/s)</b> | <b>Depth (m)</b> | <b>Flow (l/s)</b> | <b>Depth (m)</b> | <b>Flow (l/s)</b> |
| 0.100            | 3.3               | 0.600            | 4.9               | 1.600            | 5.3               | 2.600            | 6.7               | 5.000            | 9.1               | 7.500            | 11.0              |
| 0.200            | 4.6               | 0.800            | 4.3               | 1.800            | 5.6               | 3.000            | 7.1               | 5.500            | 9.5               | 8.000            | 11.4              |
| 0.300            | 4.9               | 1.000            | 4.3               | 2.000            | 5.9               | 3.500            | 7.7               | 6.000            | 9.9               | 8.500            | 11.7              |
| 0.400            | 5.0               | 1.200            | 4.7               | 2.200            | 6.2               | 4.000            | 8.2               | 6.500            | 10.3              | 9.000            | 12.0              |
| 0.500            | 5.0               | 1.400            | 5.0               | 2.400            | 6.4               | 4.500            | 8.6               | 7.000            | 10.7              | 9.500            | 12.3              |

Hydro-Brake® Optimum Manhole: 16, DS/PN: 6.002, Volume (m³): 16.9

|                   |                            |             |                           |
|-------------------|----------------------------|-------------|---------------------------|
| Unit Reference    | MD-SHE-0089-4000-1400-4000 | Flush-Flo™  | Calculated                |
| Design Head (m)   | 1.400                      | Objective   | Minimise upstream storage |
| Design Flow (l/s) | 4.0                        | Application | Surface                   |

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| Ridge and Partners LLP                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |                                                    | Page 11                                                                             |                |                           |                                   |           |               |           |                                 |           |                  |        |  |  |                |  |          |            |                |  |          |            |                           |  |       |     |           |  |       |     |            |  |       |     |                           |  |   |     |           |            |           |            |           |            |           |            |           |            |           |            |       |     |       |     |       |     |       |     |       |     |       |     |       |     |       |     |       |     |       |     |       |     |       |     |       |     |       |     |       |     |       |     |       |     |       |     |       |     |       |     |       |     |       |     |       |     |       |     |       |     |       |     |       |     |       |     |       |     |       |     |                |                            |                |     |                 |       |               |    |                   |     |                  |        |            |            |                                   |     |           |                           |                                 |      |             |         |  |  |
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| The Cowyards<br>Blenheim Park, Oxford Road<br>Woodstock OX20 1QR                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | Atlas Park<br>Proposed SW<br>Drainage Calculations |  |                |                           |                                   |           |               |           |                                 |           |                  |        |  |  |                |  |          |            |                |  |          |            |                           |  |       |     |           |  |       |     |            |  |       |     |                           |  |   |     |           |            |           |            |           |            |           |            |           |            |           |            |       |     |       |     |       |     |       |     |       |     |       |     |       |     |       |     |       |     |       |     |       |     |       |     |       |     |       |     |       |     |       |     |       |     |       |     |       |     |       |     |       |     |       |     |       |     |       |     |       |     |       |     |       |     |       |     |       |     |       |     |                |                            |                |     |                 |       |               |    |                   |     |                  |        |            |            |                                   |     |           |                           |                                 |      |             |         |  |  |
| Date 14/06/2023<br>File Proposed SW Network GFRO.MDX                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | Designed by LMc<br>Checked by PB                   |                                                                                     |                |                           |                                   |           |               |           |                                 |           |                  |        |  |  |                |  |          |            |                |  |          |            |                           |  |       |     |           |  |       |     |            |  |       |     |                           |  |   |     |           |            |           |            |           |            |           |            |           |            |           |            |       |     |       |     |       |     |       |     |       |     |       |     |       |     |       |     |       |     |       |     |       |     |       |     |       |     |       |     |       |     |       |     |       |     |       |     |       |     |       |     |       |     |       |     |       |     |       |     |       |     |       |     |       |     |       |     |       |     |       |     |                |                            |                |     |                 |       |               |    |                   |     |                  |        |            |            |                                   |     |           |                           |                                 |      |             |         |  |  |
| Innovyze                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | Network 2020.1                                     |                                                                                     |                |                           |                                   |           |               |           |                                 |           |                  |        |  |  |                |  |          |            |                |  |          |            |                           |  |       |     |           |  |       |     |            |  |       |     |                           |  |   |     |           |            |           |            |           |            |           |            |           |            |           |            |       |     |       |     |       |     |       |     |       |     |       |     |       |     |       |     |       |     |       |     |       |     |       |     |       |     |       |     |       |     |       |     |       |     |       |     |       |     |       |     |       |     |       |     |       |     |       |     |       |     |       |     |       |     |       |     |       |     |       |     |                |                            |                |     |                 |       |               |    |                   |     |                  |        |            |            |                                   |     |           |                           |                                 |      |             |         |  |  |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |                                                    |                                                                                     |                |                           |                                   |           |               |           |                                 |           |                  |        |  |  |                |  |          |            |                |  |          |            |                           |  |       |     |           |  |       |     |            |  |       |     |                           |  |   |     |           |            |           |            |           |            |           |            |           |            |           |            |       |     |       |     |       |     |       |     |       |     |       |     |       |     |       |     |       |     |       |     |       |     |       |     |       |     |       |     |       |     |       |     |       |     |       |     |       |     |       |     |       |     |       |     |       |     |       |     |       |     |       |     |       |     |       |     |       |     |       |     |                |                            |                |     |                 |       |               |    |                   |     |                  |        |            |            |                                   |     |           |                           |                                 |      |             |         |  |  |
| <p><u>Hydro-Brake® Optimum Manhole: 16, DS/PN: 6.002, Volume (m³): 16.9</u></p> <table><tr><td>Sump Available</td><td>Yes</td><td>Minimum Outlet Pipe Diameter (mm)</td><td>150</td></tr><tr><td>Diameter (mm)</td><td>89</td><td>Suggested Manhole Diameter (mm)</td><td>1200</td></tr><tr><td>Invert Level (m)</td><td>66.562</td><td></td><td></td></tr></table> <table><tr><th colspan="2">Control Points</th><th>Head (m)</th><th>Flow (l/s)</th><th colspan="2">Control Points</th><th>Head (m)</th><th>Flow (l/s)</th></tr><tr><td colspan="2">Design Point (Calculated)</td><td>1.400</td><td>4.0</td><td colspan="2">Kick-Flo®</td><td>0.791</td><td>3.1</td></tr><tr><td colspan="2">Flush-Flo™</td><td>0.387</td><td>3.8</td><td colspan="2">Mean Flow over Head Range</td><td>-</td><td>3.4</td></tr></table> <p>The hydrological calculations have been based on the Head/Discharge relationship for the Hydro-Brake® Optimum as specified. Should another type of control device other than a Hydro-Brake Optimum® be utilised then these storage routing calculations will be invalidated</p> <table><tr><th>Depth (m)</th><th>Flow (l/s)</th><th>Depth (m)</th><th>Flow (l/s)</th><th>Depth (m)</th><th>Flow (l/s)</th><th>Depth (m)</th><th>Flow (l/s)</th><th>Depth (m)</th><th>Flow (l/s)</th><th>Depth (m)</th><th>Flow (l/s)</th></tr><tr><td>0.100</td><td>2.7</td><td>0.600</td><td>3.7</td><td>1.600</td><td>4.2</td><td>2.600</td><td>5.3</td><td>5.000</td><td>7.2</td><td>7.500</td><td>8.8</td></tr><tr><td>0.200</td><td>3.6</td><td>0.800</td><td>3.1</td><td>1.800</td><td>4.5</td><td>3.000</td><td>5.7</td><td>5.500</td><td>7.6</td><td>8.000</td><td>9.1</td></tr><tr><td>0.300</td><td>3.8</td><td>1.000</td><td>3.4</td><td>2.000</td><td>4.7</td><td>3.500</td><td>6.1</td><td>6.000</td><td>7.9</td><td>8.500</td><td>9.3</td></tr><tr><td>0.400</td><td>3.8</td><td>1.200</td><td>3.7</td><td>2.200</td><td>4.9</td><td>4.000</td><td>6.5</td><td>6.500</td><td>8.2</td><td>9.000</td><td>9.6</td></tr><tr><td>0.500</td><td>3.8</td><td>1.400</td><td>4.0</td><td>2.400</td><td>5.1</td><td>4.500</td><td>6.9</td><td>7.000</td><td>8.5</td><td>9.500</td><td>9.8</td></tr></table> <p><u>Hydro-Brake® Optimum Manhole: 20, DS/PN: 8.002, Volume (m³): 12.3</u></p> <table><tr><td>Unit Reference</td><td>MD-SHE-0090-4000-1350-4000</td><td>Sump Available</td><td>Yes</td></tr><tr><td>Design Head (m)</td><td>1.350</td><td>Diameter (mm)</td><td>90</td></tr><tr><td>Design Flow (l/s)</td><td>4.0</td><td>Invert Level (m)</td><td>66.845</td></tr><tr><td>Flush-Flo™</td><td>Calculated</td><td>Minimum Outlet Pipe Diameter (mm)</td><td>150</td></tr><tr><td>Objective</td><td>Minimise upstream storage</td><td>Suggested Manhole Diameter (mm)</td><td>1200</td></tr><tr><td>Application</td><td>Surface</td><td></td><td></td></tr></table> |                                                    |                                                                                     | Sump Available | Yes                       | Minimum Outlet Pipe Diameter (mm) | 150       | Diameter (mm) | 89        | Suggested Manhole Diameter (mm) | 1200      | Invert Level (m) | 66.562 |  |  | Control Points |  | Head (m) | Flow (l/s) | Control Points |  | Head (m) | Flow (l/s) | Design Point (Calculated) |  | 1.400 | 4.0 | Kick-Flo® |  | 0.791 | 3.1 | Flush-Flo™ |  | 0.387 | 3.8 | Mean Flow over Head Range |  | - | 3.4 | Depth (m) | Flow (l/s) | Depth (m) | Flow (l/s) | Depth (m) | Flow (l/s) | Depth (m) | Flow (l/s) | Depth (m) | Flow (l/s) | Depth (m) | Flow (l/s) | 0.100 | 2.7 | 0.600 | 3.7 | 1.600 | 4.2 | 2.600 | 5.3 | 5.000 | 7.2 | 7.500 | 8.8 | 0.200 | 3.6 | 0.800 | 3.1 | 1.800 | 4.5 | 3.000 | 5.7 | 5.500 | 7.6 | 8.000 | 9.1 | 0.300 | 3.8 | 1.000 | 3.4 | 2.000 | 4.7 | 3.500 | 6.1 | 6.000 | 7.9 | 8.500 | 9.3 | 0.400 | 3.8 | 1.200 | 3.7 | 2.200 | 4.9 | 4.000 | 6.5 | 6.500 | 8.2 | 9.000 | 9.6 | 0.500 | 3.8 | 1.400 | 4.0 | 2.400 | 5.1 | 4.500 | 6.9 | 7.000 | 8.5 | 9.500 | 9.8 | Unit Reference | MD-SHE-0090-4000-1350-4000 | Sump Available | Yes | Design Head (m) | 1.350 | Diameter (mm) | 90 | Design Flow (l/s) | 4.0 | Invert Level (m) | 66.845 | Flush-Flo™ | Calculated | Minimum Outlet Pipe Diameter (mm) | 150 | Objective | Minimise upstream storage | Suggested Manhole Diameter (mm) | 1200 | Application | Surface |  |  |
| Sump Available                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | Yes                                                | Minimum Outlet Pipe Diameter (mm)                                                   | 150            |                           |                                   |           |               |           |                                 |           |                  |        |  |  |                |  |          |            |                |  |          |            |                           |  |       |     |           |  |       |     |            |  |       |     |                           |  |   |     |           |            |           |            |           |            |           |            |           |            |           |            |       |     |       |     |       |     |       |     |       |     |       |     |       |     |       |     |       |     |       |     |       |     |       |     |       |     |       |     |       |     |       |     |       |     |       |     |       |     |       |     |       |     |       |     |       |     |       |     |       |     |       |     |       |     |       |     |       |     |       |     |                |                            |                |     |                 |       |               |    |                   |     |                  |        |            |            |                                   |     |           |                           |                                 |      |             |         |  |  |
| Diameter (mm)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | 89                                                 | Suggested Manhole Diameter (mm)                                                     | 1200           |                           |                                   |           |               |           |                                 |           |                  |        |  |  |                |  |          |            |                |  |          |            |                           |  |       |     |           |  |       |     |            |  |       |     |                           |  |   |     |           |            |           |            |           |            |           |            |           |            |           |            |       |     |       |     |       |     |       |     |       |     |       |     |       |     |       |     |       |     |       |     |       |     |       |     |       |     |       |     |       |     |       |     |       |     |       |     |       |     |       |     |       |     |       |     |       |     |       |     |       |     |       |     |       |     |       |     |       |     |       |     |                |                            |                |     |                 |       |               |    |                   |     |                  |        |            |            |                                   |     |           |                           |                                 |      |             |         |  |  |
| Invert Level (m)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | 66.562                                             |                                                                                     |                |                           |                                   |           |               |           |                                 |           |                  |        |  |  |                |  |          |            |                |  |          |            |                           |  |       |     |           |  |       |     |            |  |       |     |                           |  |   |     |           |            |           |            |           |            |           |            |           |            |           |            |       |     |       |     |       |     |       |     |       |     |       |     |       |     |       |     |       |     |       |     |       |     |       |     |       |     |       |     |       |     |       |     |       |     |       |     |       |     |       |     |       |     |       |     |       |     |       |     |       |     |       |     |       |     |       |     |       |     |       |     |                |                            |                |     |                 |       |               |    |                   |     |                  |        |            |            |                                   |     |           |                           |                                 |      |             |         |  |  |
| Control Points                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |                                                    | Head (m)                                                                            | Flow (l/s)     | Control Points            |                                   | Head (m)  | Flow (l/s)    |           |                                 |           |                  |        |  |  |                |  |          |            |                |  |          |            |                           |  |       |     |           |  |       |     |            |  |       |     |                           |  |   |     |           |            |           |            |           |            |           |            |           |            |           |            |       |     |       |     |       |     |       |     |       |     |       |     |       |     |       |     |       |     |       |     |       |     |       |     |       |     |       |     |       |     |       |     |       |     |       |     |       |     |       |     |       |     |       |     |       |     |       |     |       |     |       |     |       |     |       |     |       |     |       |     |                |                            |                |     |                 |       |               |    |                   |     |                  |        |            |            |                                   |     |           |                           |                                 |      |             |         |  |  |
| Design Point (Calculated)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |                                                    | 1.400                                                                               | 4.0            | Kick-Flo®                 |                                   | 0.791     | 3.1           |           |                                 |           |                  |        |  |  |                |  |          |            |                |  |          |            |                           |  |       |     |           |  |       |     |            |  |       |     |                           |  |   |     |           |            |           |            |           |            |           |            |           |            |           |            |       |     |       |     |       |     |       |     |       |     |       |     |       |     |       |     |       |     |       |     |       |     |       |     |       |     |       |     |       |     |       |     |       |     |       |     |       |     |       |     |       |     |       |     |       |     |       |     |       |     |       |     |       |     |       |     |       |     |       |     |                |                            |                |     |                 |       |               |    |                   |     |                  |        |            |            |                                   |     |           |                           |                                 |      |             |         |  |  |
| Flush-Flo™                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |                                                    | 0.387                                                                               | 3.8            | Mean Flow over Head Range |                                   | -         | 3.4           |           |                                 |           |                  |        |  |  |                |  |          |            |                |  |          |            |                           |  |       |     |           |  |       |     |            |  |       |     |                           |  |   |     |           |            |           |            |           |            |           |            |           |            |           |            |       |     |       |     |       |     |       |     |       |     |       |     |       |     |       |     |       |     |       |     |       |     |       |     |       |     |       |     |       |     |       |     |       |     |       |     |       |     |       |     |       |     |       |     |       |     |       |     |       |     |       |     |       |     |       |     |       |     |       |     |                |                            |                |     |                 |       |               |    |                   |     |                  |        |            |            |                                   |     |           |                           |                                 |      |             |         |  |  |
| Depth (m)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | Flow (l/s)                                         | Depth (m)                                                                           | Flow (l/s)     | Depth (m)                 | Flow (l/s)                        | Depth (m) | Flow (l/s)    | Depth (m) | Flow (l/s)                      | Depth (m) | Flow (l/s)       |        |  |  |                |  |          |            |                |  |          |            |                           |  |       |     |           |  |       |     |            |  |       |     |                           |  |   |     |           |            |           |            |           |            |           |            |           |            |           |            |       |     |       |     |       |     |       |     |       |     |       |     |       |     |       |     |       |     |       |     |       |     |       |     |       |     |       |     |       |     |       |     |       |     |       |     |       |     |       |     |       |     |       |     |       |     |       |     |       |     |       |     |       |     |       |     |       |     |       |     |                |                            |                |     |                 |       |               |    |                   |     |                  |        |            |            |                                   |     |           |                           |                                 |      |             |         |  |  |
| 0.100                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | 2.7                                                | 0.600                                                                               | 3.7            | 1.600                     | 4.2                               | 2.600     | 5.3           | 5.000     | 7.2                             | 7.500     | 8.8              |        |  |  |                |  |          |            |                |  |          |            |                           |  |       |     |           |  |       |     |            |  |       |     |                           |  |   |     |           |            |           |            |           |            |           |            |           |            |           |            |       |     |       |     |       |     |       |     |       |     |       |     |       |     |       |     |       |     |       |     |       |     |       |     |       |     |       |     |       |     |       |     |       |     |       |     |       |     |       |     |       |     |       |     |       |     |       |     |       |     |       |     |       |     |       |     |       |     |       |     |                |                            |                |     |                 |       |               |    |                   |     |                  |        |            |            |                                   |     |           |                           |                                 |      |             |         |  |  |
| 0.200                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | 3.6                                                | 0.800                                                                               | 3.1            | 1.800                     | 4.5                               | 3.000     | 5.7           | 5.500     | 7.6                             | 8.000     | 9.1              |        |  |  |                |  |          |            |                |  |          |            |                           |  |       |     |           |  |       |     |            |  |       |     |                           |  |   |     |           |            |           |            |           |            |           |            |           |            |           |            |       |     |       |     |       |     |       |     |       |     |       |     |       |     |       |     |       |     |       |     |       |     |       |     |       |     |       |     |       |     |       |     |       |     |       |     |       |     |       |     |       |     |       |     |       |     |       |     |       |     |       |     |       |     |       |     |       |     |       |     |                |                            |                |     |                 |       |               |    |                   |     |                  |        |            |            |                                   |     |           |                           |                                 |      |             |         |  |  |
| 0.300                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | 3.8                                                | 1.000                                                                               | 3.4            | 2.000                     | 4.7                               | 3.500     | 6.1           | 6.000     | 7.9                             | 8.500     | 9.3              |        |  |  |                |  |          |            |                |  |          |            |                           |  |       |     |           |  |       |     |            |  |       |     |                           |  |   |     |           |            |           |            |           |            |           |            |           |            |           |            |       |     |       |     |       |     |       |     |       |     |       |     |       |     |       |     |       |     |       |     |       |     |       |     |       |     |       |     |       |     |       |     |       |     |       |     |       |     |       |     |       |     |       |     |       |     |       |     |       |     |       |     |       |     |       |     |       |     |       |     |                |                            |                |     |                 |       |               |    |                   |     |                  |        |            |            |                                   |     |           |                           |                                 |      |             |         |  |  |
| 0.400                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | 3.8                                                | 1.200                                                                               | 3.7            | 2.200                     | 4.9                               | 4.000     | 6.5           | 6.500     | 8.2                             | 9.000     | 9.6              |        |  |  |                |  |          |            |                |  |          |            |                           |  |       |     |           |  |       |     |            |  |       |     |                           |  |   |     |           |            |           |            |           |            |           |            |           |            |           |            |       |     |       |     |       |     |       |     |       |     |       |     |       |     |       |     |       |     |       |     |       |     |       |     |       |     |       |     |       |     |       |     |       |     |       |     |       |     |       |     |       |     |       |     |       |     |       |     |       |     |       |     |       |     |       |     |       |     |       |     |                |                            |                |     |                 |       |               |    |                   |     |                  |        |            |            |                                   |     |           |                           |                                 |      |             |         |  |  |
| 0.500                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | 3.8                                                | 1.400                                                                               | 4.0            | 2.400                     | 5.1                               | 4.500     | 6.9           | 7.000     | 8.5                             | 9.500     | 9.8              |        |  |  |                |  |          |            |                |  |          |            |                           |  |       |     |           |  |       |     |            |  |       |     |                           |  |   |     |           |            |           |            |           |            |           |            |           |            |           |            |       |     |       |     |       |     |       |     |       |     |       |     |       |     |       |     |       |     |       |     |       |     |       |     |       |     |       |     |       |     |       |     |       |     |       |     |       |     |       |     |       |     |       |     |       |     |       |     |       |     |       |     |       |     |       |     |       |     |       |     |                |                            |                |     |                 |       |               |    |                   |     |                  |        |            |            |                                   |     |           |                           |                                 |      |             |         |  |  |
| Unit Reference                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | MD-SHE-0090-4000-1350-4000                         | Sump Available                                                                      | Yes            |                           |                                   |           |               |           |                                 |           |                  |        |  |  |                |  |          |            |                |  |          |            |                           |  |       |     |           |  |       |     |            |  |       |     |                           |  |   |     |           |            |           |            |           |            |           |            |           |            |           |            |       |     |       |     |       |     |       |     |       |     |       |     |       |     |       |     |       |     |       |     |       |     |       |     |       |     |       |     |       |     |       |     |       |     |       |     |       |     |       |     |       |     |       |     |       |     |       |     |       |     |       |     |       |     |       |     |       |     |       |     |                |                            |                |     |                 |       |               |    |                   |     |                  |        |            |            |                                   |     |           |                           |                                 |      |             |         |  |  |
| Design Head (m)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | 1.350                                              | Diameter (mm)                                                                       | 90             |                           |                                   |           |               |           |                                 |           |                  |        |  |  |                |  |          |            |                |  |          |            |                           |  |       |     |           |  |       |     |            |  |       |     |                           |  |   |     |           |            |           |            |           |            |           |            |           |            |           |            |       |     |       |     |       |     |       |     |       |     |       |     |       |     |       |     |       |     |       |     |       |     |       |     |       |     |       |     |       |     |       |     |       |     |       |     |       |     |       |     |       |     |       |     |       |     |       |     |       |     |       |     |       |     |       |     |       |     |       |     |                |                            |                |     |                 |       |               |    |                   |     |                  |        |            |            |                                   |     |           |                           |                                 |      |             |         |  |  |
| Design Flow (l/s)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | 4.0                                                | Invert Level (m)                                                                    | 66.845         |                           |                                   |           |               |           |                                 |           |                  |        |  |  |                |  |          |            |                |  |          |            |                           |  |       |     |           |  |       |     |            |  |       |     |                           |  |   |     |           |            |           |            |           |            |           |            |           |            |           |            |       |     |       |     |       |     |       |     |       |     |       |     |       |     |       |     |       |     |       |     |       |     |       |     |       |     |       |     |       |     |       |     |       |     |       |     |       |     |       |     |       |     |       |     |       |     |       |     |       |     |       |     |       |     |       |     |       |     |       |     |                |                            |                |     |                 |       |               |    |                   |     |                  |        |            |            |                                   |     |           |                           |                                 |      |             |         |  |  |
| Flush-Flo™                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | Calculated                                         | Minimum Outlet Pipe Diameter (mm)                                                   | 150            |                           |                                   |           |               |           |                                 |           |                  |        |  |  |                |  |          |            |                |  |          |            |                           |  |       |     |           |  |       |     |            |  |       |     |                           |  |   |     |           |            |           |            |           |            |           |            |           |            |           |            |       |     |       |     |       |     |       |     |       |     |       |     |       |     |       |     |       |     |       |     |       |     |       |     |       |     |       |     |       |     |       |     |       |     |       |     |       |     |       |     |       |     |       |     |       |     |       |     |       |     |       |     |       |     |       |     |       |     |       |     |                |                            |                |     |                 |       |               |    |                   |     |                  |        |            |            |                                   |     |           |                           |                                 |      |             |         |  |  |
| Objective                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | Minimise upstream storage                          | Suggested Manhole Diameter (mm)                                                     | 1200           |                           |                                   |           |               |           |                                 |           |                  |        |  |  |                |  |          |            |                |  |          |            |                           |  |       |     |           |  |       |     |            |  |       |     |                           |  |   |     |           |            |           |            |           |            |           |            |           |            |           |            |       |     |       |     |       |     |       |     |       |     |       |     |       |     |       |     |       |     |       |     |       |     |       |     |       |     |       |     |       |     |       |     |       |     |       |     |       |     |       |     |       |     |       |     |       |     |       |     |       |     |       |     |       |     |       |     |       |     |       |     |                |                            |                |     |                 |       |               |    |                   |     |                  |        |            |            |                                   |     |           |                           |                                 |      |             |         |  |  |
| Application                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | Surface                                            |                                                                                     |                |                           |                                   |           |               |           |                                 |           |                  |        |  |  |                |  |          |            |                |  |          |            |                           |  |       |     |           |  |       |     |            |  |       |     |                           |  |   |     |           |            |           |            |           |            |           |            |           |            |           |            |       |     |       |     |       |     |       |     |       |     |       |     |       |     |       |     |       |     |       |     |       |     |       |     |       |     |       |     |       |     |       |     |       |     |       |     |       |     |       |     |       |     |       |     |       |     |       |     |       |     |       |     |       |     |       |     |       |     |       |     |                |                            |                |     |                 |       |               |    |                   |     |                  |        |            |            |                                   |     |           |                           |                                 |      |             |         |  |  |
| ©1982-2020 Innovyze                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |                                                    |                                                                                     |                |                           |                                   |           |               |           |                                 |           |                  |        |  |  |                |  |          |            |                |  |          |            |                           |  |       |     |           |  |       |     |            |  |       |     |                           |  |   |     |           |            |           |            |           |            |           |            |           |            |           |            |       |     |       |     |       |     |       |     |       |     |       |     |       |     |       |     |       |     |       |     |       |     |       |     |       |     |       |     |       |     |       |     |       |     |       |     |       |     |       |     |       |     |       |     |       |     |       |     |       |     |       |     |       |     |       |     |       |     |       |     |                |                            |                |     |                 |       |               |    |                   |     |                  |        |            |            |                                   |     |           |                           |                                 |      |             |         |  |  |

| Ridge and Partners LLP                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |                            |                                   |            | Page 12                                            |            |            |                           |                                                                                     |            |            |            |                |                                                                                                                                                                                                                                         |                |            |                 |                |               |            |                   |            |                  |                           |            |            |                                   |     |           |                           |                                 |      |             |         |       |     |       |     |       |     |       |     |       |     |       |     |       |     |       |     |       |     |       |     |       |     |       |     |       |     |       |     |       |     |       |     |       |     |       |     |       |     |       |     |       |     |       |     |       |     |       |     |       |      |
|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------|-----------------------------------|------------|----------------------------------------------------|------------|------------|---------------------------|-------------------------------------------------------------------------------------|------------|------------|------------|----------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------|------------|-----------------|----------------|---------------|------------|-------------------|------------|------------------|---------------------------|------------|------------|-----------------------------------|-----|-----------|---------------------------|---------------------------------|------|-------------|---------|-------|-----|-------|-----|-------|-----|-------|-----|-------|-----|-------|-----|-------|-----|-------|-----|-------|-----|-------|-----|-------|-----|-------|-----|-------|-----|-------|-----|-------|-----|-------|-----|-------|-----|-------|-----|-------|-----|-------|-----|-------|-----|-------|-----|-------|-----|-------|-----|-------|------|
| The Cowyards<br>Blenheim Park, Oxford Road<br>Woodstock OX20 1QR                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |                            |                                   |            | Atlas Park<br>Proposed SW<br>Drainage Calculations |            |            |                           |  |            |            |            |                |                                                                                                                                                                                                                                         |                |            |                 |                |               |            |                   |            |                  |                           |            |            |                                   |     |           |                           |                                 |      |             |         |       |     |       |     |       |     |       |     |       |     |       |     |       |     |       |     |       |     |       |     |       |     |       |     |       |     |       |     |       |     |       |     |       |     |       |     |       |     |       |     |       |     |       |     |       |     |       |     |       |      |
| Date 14/06/2023<br>File Proposed SW Network GFRO.MDX                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |                            |                                   |            | Designed by LMc<br>Checked by PB                   |            |            |                           |                                                                                     |            |            |            |                |                                                                                                                                                                                                                                         |                |            |                 |                |               |            |                   |            |                  |                           |            |            |                                   |     |           |                           |                                 |      |             |         |       |     |       |     |       |     |       |     |       |     |       |     |       |     |       |     |       |     |       |     |       |     |       |     |       |     |       |     |       |     |       |     |       |     |       |     |       |     |       |     |       |     |       |     |       |     |       |     |       |      |
| Innovyze                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |                            |                                   |            | Network 2020.1                                     |            |            |                           |                                                                                     |            |            |            |                |                                                                                                                                                                                                                                         |                |            |                 |                |               |            |                   |            |                  |                           |            |            |                                   |     |           |                           |                                 |      |             |         |       |     |       |     |       |     |       |     |       |     |       |     |       |     |       |     |       |     |       |     |       |     |       |     |       |     |       |     |       |     |       |     |       |     |       |     |       |     |       |     |       |     |       |     |       |     |       |     |       |      |
| <p style="text-align: center;"><u>Hydro-Brake® Optimum Manhole: 20, DS/PN: 8.002, Volume (m³): 12.3</u></p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |                            |                                   |            |                                                    |            |            |                           |                                                                                     |            |            |            |                |                                                                                                                                                                                                                                         |                |            |                 |                |               |            |                   |            |                  |                           |            |            |                                   |     |           |                           |                                 |      |             |         |       |     |       |     |       |     |       |     |       |     |       |     |       |     |       |     |       |     |       |     |       |     |       |     |       |     |       |     |       |     |       |     |       |     |       |     |       |     |       |     |       |     |       |     |       |     |       |     |       |      |
| <table><thead><tr><th>Control Points</th><th>Head (m)</th><th>Flow (l/s)</th></tr></thead><tbody><tr><td>Design Point (Calculated)</td><td>1.350</td><td>4.0</td></tr><tr><td>Flush-Flo™</td><td>0.396</td><td>3.9</td></tr></tbody></table>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |                            |                                   |            | Control Points                                     | Head (m)   | Flow (l/s) | Design Point (Calculated) | 1.350                                                                               | 4.0        | Flush-Flo™ | 0.396      | 3.9            | <table><thead><tr><th>Control Points</th><th>Head (m)</th><th>Flow (l/s)</th></tr></thead><tbody><tr><td>Kick-Flo®</td><td>0.802</td><td>3.1</td></tr><tr><td>Mean Flow over Head Range</td><td>-</td><td>3.5</td></tr></tbody></table> |                |            |                 | Control Points | Head (m)      | Flow (l/s) | Kick-Flo®         | 0.802      | 3.1              | Mean Flow over Head Range | -          | 3.5        |                                   |     |           |                           |                                 |      |             |         |       |     |       |     |       |     |       |     |       |     |       |     |       |     |       |     |       |     |       |     |       |     |       |     |       |     |       |     |       |     |       |     |       |     |       |     |       |     |       |     |       |     |       |     |       |     |       |     |       |      |
| Control Points                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | Head (m)                   | Flow (l/s)                        |            |                                                    |            |            |                           |                                                                                     |            |            |            |                |                                                                                                                                                                                                                                         |                |            |                 |                |               |            |                   |            |                  |                           |            |            |                                   |     |           |                           |                                 |      |             |         |       |     |       |     |       |     |       |     |       |     |       |     |       |     |       |     |       |     |       |     |       |     |       |     |       |     |       |     |       |     |       |     |       |     |       |     |       |     |       |     |       |     |       |     |       |     |       |     |       |      |
| Design Point (Calculated)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | 1.350                      | 4.0                               |            |                                                    |            |            |                           |                                                                                     |            |            |            |                |                                                                                                                                                                                                                                         |                |            |                 |                |               |            |                   |            |                  |                           |            |            |                                   |     |           |                           |                                 |      |             |         |       |     |       |     |       |     |       |     |       |     |       |     |       |     |       |     |       |     |       |     |       |     |       |     |       |     |       |     |       |     |       |     |       |     |       |     |       |     |       |     |       |     |       |     |       |     |       |     |       |      |
| Flush-Flo™                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | 0.396                      | 3.9                               |            |                                                    |            |            |                           |                                                                                     |            |            |            |                |                                                                                                                                                                                                                                         |                |            |                 |                |               |            |                   |            |                  |                           |            |            |                                   |     |           |                           |                                 |      |             |         |       |     |       |     |       |     |       |     |       |     |       |     |       |     |       |     |       |     |       |     |       |     |       |     |       |     |       |     |       |     |       |     |       |     |       |     |       |     |       |     |       |     |       |     |       |     |       |     |       |      |
| Control Points                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | Head (m)                   | Flow (l/s)                        |            |                                                    |            |            |                           |                                                                                     |            |            |            |                |                                                                                                                                                                                                                                         |                |            |                 |                |               |            |                   |            |                  |                           |            |            |                                   |     |           |                           |                                 |      |             |         |       |     |       |     |       |     |       |     |       |     |       |     |       |     |       |     |       |     |       |     |       |     |       |     |       |     |       |     |       |     |       |     |       |     |       |     |       |     |       |     |       |     |       |     |       |     |       |     |       |      |
| Kick-Flo®                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | 0.802                      | 3.1                               |            |                                                    |            |            |                           |                                                                                     |            |            |            |                |                                                                                                                                                                                                                                         |                |            |                 |                |               |            |                   |            |                  |                           |            |            |                                   |     |           |                           |                                 |      |             |         |       |     |       |     |       |     |       |     |       |     |       |     |       |     |       |     |       |     |       |     |       |     |       |     |       |     |       |     |       |     |       |     |       |     |       |     |       |     |       |     |       |     |       |     |       |     |       |     |       |      |
| Mean Flow over Head Range                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | -                          | 3.5                               |            |                                                    |            |            |                           |                                                                                     |            |            |            |                |                                                                                                                                                                                                                                         |                |            |                 |                |               |            |                   |            |                  |                           |            |            |                                   |     |           |                           |                                 |      |             |         |       |     |       |     |       |     |       |     |       |     |       |     |       |     |       |     |       |     |       |     |       |     |       |     |       |     |       |     |       |     |       |     |       |     |       |     |       |     |       |     |       |     |       |     |       |     |       |     |       |      |
| <p>The hydrological calculations have been based on the Head/Discharge relationship for the Hydro-Brake® Optimum as specified. Should another type of control device other than a Hydro-Brake Optimum® be utilised then these storage routing calculations will be invalidated</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |                            |                                   |            |                                                    |            |            |                           |                                                                                     |            |            |            |                |                                                                                                                                                                                                                                         |                |            |                 |                |               |            |                   |            |                  |                           |            |            |                                   |     |           |                           |                                 |      |             |         |       |     |       |     |       |     |       |     |       |     |       |     |       |     |       |     |       |     |       |     |       |     |       |     |       |     |       |     |       |     |       |     |       |     |       |     |       |     |       |     |       |     |       |     |       |     |       |     |       |      |
| <table><thead><tr><th>Depth (m)</th><th>Flow (l/s)</th><th>Depth (m)</th><th>Flow (l/s)</th><th>Depth (m)</th><th>Flow (l/s)</th><th>Depth (m)</th><th>Flow (l/s)</th><th>Depth (m)</th><th>Flow (l/s)</th><th>Depth (m)</th><th>Flow (l/s)</th></tr></thead><tbody><tr><td>0.100</td><td>2.8</td><td>0.600</td><td>3.8</td><td>1.600</td><td>4.3</td><td>2.600</td><td>5.4</td><td>5.000</td><td>7.4</td><td>7.500</td><td>8.9</td></tr><tr><td>0.200</td><td>3.6</td><td>0.800</td><td>3.2</td><td>1.800</td><td>4.6</td><td>3.000</td><td>5.8</td><td>5.500</td><td>7.7</td><td>8.000</td><td>9.2</td></tr><tr><td>0.300</td><td>3.9</td><td>1.000</td><td>3.5</td><td>2.000</td><td>4.8</td><td>3.500</td><td>6.2</td><td>6.000</td><td>8.0</td><td>8.500</td><td>9.5</td></tr><tr><td>0.400</td><td>3.9</td><td>1.200</td><td>3.8</td><td>2.200</td><td>5.0</td><td>4.000</td><td>6.6</td><td>6.500</td><td>8.3</td><td>9.000</td><td>9.7</td></tr><tr><td>0.500</td><td>3.9</td><td>1.400</td><td>4.1</td><td>2.400</td><td>5.2</td><td>4.500</td><td>7.0</td><td>7.000</td><td>8.6</td><td>9.500</td><td>10.0</td></tr></tbody></table> |                            |                                   |            |                                                    |            |            |                           |                                                                                     |            |            |            | Depth (m)      | Flow (l/s)                                                                                                                                                                                                                              | Depth (m)      | Flow (l/s) | Depth (m)       | Flow (l/s)     | Depth (m)     | Flow (l/s) | Depth (m)         | Flow (l/s) | Depth (m)        | Flow (l/s)                | 0.100      | 2.8        | 0.600                             | 3.8 | 1.600     | 4.3                       | 2.600                           | 5.4  | 5.000       | 7.4     | 7.500 | 8.9 | 0.200 | 3.6 | 0.800 | 3.2 | 1.800 | 4.6 | 3.000 | 5.8 | 5.500 | 7.7 | 8.000 | 9.2 | 0.300 | 3.9 | 1.000 | 3.5 | 2.000 | 4.8 | 3.500 | 6.2 | 6.000 | 8.0 | 8.500 | 9.5 | 0.400 | 3.9 | 1.200 | 3.8 | 2.200 | 5.0 | 4.000 | 6.6 | 6.500 | 8.3 | 9.000 | 9.7 | 0.500 | 3.9 | 1.400 | 4.1 | 2.400 | 5.2 | 4.500 | 7.0 | 7.000 | 8.6 | 9.500 | 10.0 |
| Depth (m)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | Flow (l/s)                 | Depth (m)                         | Flow (l/s) | Depth (m)                                          | Flow (l/s) | Depth (m)  | Flow (l/s)                | Depth (m)                                                                           | Flow (l/s) | Depth (m)  | Flow (l/s) |                |                                                                                                                                                                                                                                         |                |            |                 |                |               |            |                   |            |                  |                           |            |            |                                   |     |           |                           |                                 |      |             |         |       |     |       |     |       |     |       |     |       |     |       |     |       |     |       |     |       |     |       |     |       |     |       |     |       |     |       |     |       |     |       |     |       |     |       |     |       |     |       |     |       |     |       |     |       |     |       |     |       |      |
| 0.100                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | 2.8                        | 0.600                             | 3.8        | 1.600                                              | 4.3        | 2.600      | 5.4                       | 5.000                                                                               | 7.4        | 7.500      | 8.9        |                |                                                                                                                                                                                                                                         |                |            |                 |                |               |            |                   |            |                  |                           |            |            |                                   |     |           |                           |                                 |      |             |         |       |     |       |     |       |     |       |     |       |     |       |     |       |     |       |     |       |     |       |     |       |     |       |     |       |     |       |     |       |     |       |     |       |     |       |     |       |     |       |     |       |     |       |     |       |     |       |     |       |      |
| 0.200                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | 3.6                        | 0.800                             | 3.2        | 1.800                                              | 4.6        | 3.000      | 5.8                       | 5.500                                                                               | 7.7        | 8.000      | 9.2        |                |                                                                                                                                                                                                                                         |                |            |                 |                |               |            |                   |            |                  |                           |            |            |                                   |     |           |                           |                                 |      |             |         |       |     |       |     |       |     |       |     |       |     |       |     |       |     |       |     |       |     |       |     |       |     |       |     |       |     |       |     |       |     |       |     |       |     |       |     |       |     |       |     |       |     |       |     |       |     |       |     |       |      |
| 0.300                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | 3.9                        | 1.000                             | 3.5        | 2.000                                              | 4.8        | 3.500      | 6.2                       | 6.000                                                                               | 8.0        | 8.500      | 9.5        |                |                                                                                                                                                                                                                                         |                |            |                 |                |               |            |                   |            |                  |                           |            |            |                                   |     |           |                           |                                 |      |             |         |       |     |       |     |       |     |       |     |       |     |       |     |       |     |       |     |       |     |       |     |       |     |       |     |       |     |       |     |       |     |       |     |       |     |       |     |       |     |       |     |       |     |       |     |       |     |       |     |       |      |
| 0.400                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | 3.9                        | 1.200                             | 3.8        | 2.200                                              | 5.0        | 4.000      | 6.6                       | 6.500                                                                               | 8.3        | 9.000      | 9.7        |                |                                                                                                                                                                                                                                         |                |            |                 |                |               |            |                   |            |                  |                           |            |            |                                   |     |           |                           |                                 |      |             |         |       |     |       |     |       |     |       |     |       |     |       |     |       |     |       |     |       |     |       |     |       |     |       |     |       |     |       |     |       |     |       |     |       |     |       |     |       |     |       |     |       |     |       |     |       |     |       |     |       |      |
| 0.500                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | 3.9                        | 1.400                             | 4.1        | 2.400                                              | 5.2        | 4.500      | 7.0                       | 7.000                                                                               | 8.6        | 9.500      | 10.0       |                |                                                                                                                                                                                                                                         |                |            |                 |                |               |            |                   |            |                  |                           |            |            |                                   |     |           |                           |                                 |      |             |         |       |     |       |     |       |     |       |     |       |     |       |     |       |     |       |     |       |     |       |     |       |     |       |     |       |     |       |     |       |     |       |     |       |     |       |     |       |     |       |     |       |     |       |     |       |     |       |     |       |      |
| <p style="text-align: center;"><u>Hydro-Brake® Optimum Manhole: 32, DS/PN: 11.004, Volume (m³): 10.8</u></p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |                            |                                   |            |                                                    |            |            |                           |                                                                                     |            |            |            |                |                                                                                                                                                                                                                                         |                |            |                 |                |               |            |                   |            |                  |                           |            |            |                                   |     |           |                           |                                 |      |             |         |       |     |       |     |       |     |       |     |       |     |       |     |       |     |       |     |       |     |       |     |       |     |       |     |       |     |       |     |       |     |       |     |       |     |       |     |       |     |       |     |       |     |       |     |       |     |       |     |       |      |
| <table><tbody><tr><td>Unit Reference</td><td>MD-SHE-0103-6000-1800-6000</td><td>Sump Available</td><td>Yes</td></tr><tr><td>Design Head (m)</td><td>1.800</td><td>Diameter (mm)</td><td>103</td></tr><tr><td>Design Flow (l/s)</td><td>6.0</td><td>Invert Level (m)</td><td>65.625</td></tr><tr><td>Flush-Flo™</td><td>Calculated</td><td>Minimum Outlet Pipe Diameter (mm)</td><td>150</td></tr><tr><td>Objective</td><td>Minimise upstream storage</td><td>Suggested Manhole Diameter (mm)</td><td>1200</td></tr><tr><td>Application</td><td>Surface</td><td></td><td></td></tr></tbody></table>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |                            |                                   |            |                                                    |            |            |                           |                                                                                     |            |            |            | Unit Reference | MD-SHE-0103-6000-1800-6000                                                                                                                                                                                                              | Sump Available | Yes        | Design Head (m) | 1.800          | Diameter (mm) | 103        | Design Flow (l/s) | 6.0        | Invert Level (m) | 65.625                    | Flush-Flo™ | Calculated | Minimum Outlet Pipe Diameter (mm) | 150 | Objective | Minimise upstream storage | Suggested Manhole Diameter (mm) | 1200 | Application | Surface |       |     |       |     |       |     |       |     |       |     |       |     |       |     |       |     |       |     |       |     |       |     |       |     |       |     |       |     |       |     |       |     |       |     |       |     |       |     |       |     |       |     |       |     |       |     |       |     |       |      |
| Unit Reference                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | MD-SHE-0103-6000-1800-6000 | Sump Available                    | Yes        |                                                    |            |            |                           |                                                                                     |            |            |            |                |                                                                                                                                                                                                                                         |                |            |                 |                |               |            |                   |            |                  |                           |            |            |                                   |     |           |                           |                                 |      |             |         |       |     |       |     |       |     |       |     |       |     |       |     |       |     |       |     |       |     |       |     |       |     |       |     |       |     |       |     |       |     |       |     |       |     |       |     |       |     |       |     |       |     |       |     |       |     |       |     |       |      |
| Design Head (m)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | 1.800                      | Diameter (mm)                     | 103        |                                                    |            |            |                           |                                                                                     |            |            |            |                |                                                                                                                                                                                                                                         |                |            |                 |                |               |            |                   |            |                  |                           |            |            |                                   |     |           |                           |                                 |      |             |         |       |     |       |     |       |     |       |     |       |     |       |     |       |     |       |     |       |     |       |     |       |     |       |     |       |     |       |     |       |     |       |     |       |     |       |     |       |     |       |     |       |     |       |     |       |     |       |     |       |      |
| Design Flow (l/s)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | 6.0                        | Invert Level (m)                  | 65.625     |                                                    |            |            |                           |                                                                                     |            |            |            |                |                                                                                                                                                                                                                                         |                |            |                 |                |               |            |                   |            |                  |                           |            |            |                                   |     |           |                           |                                 |      |             |         |       |     |       |     |       |     |       |     |       |     |       |     |       |     |       |     |       |     |       |     |       |     |       |     |       |     |       |     |       |     |       |     |       |     |       |     |       |     |       |     |       |     |       |     |       |     |       |     |       |      |
| Flush-Flo™                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | Calculated                 | Minimum Outlet Pipe Diameter (mm) | 150        |                                                    |            |            |                           |                                                                                     |            |            |            |                |                                                                                                                                                                                                                                         |                |            |                 |                |               |            |                   |            |                  |                           |            |            |                                   |     |           |                           |                                 |      |             |         |       |     |       |     |       |     |       |     |       |     |       |     |       |     |       |     |       |     |       |     |       |     |       |     |       |     |       |     |       |     |       |     |       |     |       |     |       |     |       |     |       |     |       |     |       |     |       |     |       |      |
| Objective                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | Minimise upstream storage  | Suggested Manhole Diameter (mm)   | 1200       |                                                    |            |            |                           |                                                                                     |            |            |            |                |                                                                                                                                                                                                                                         |                |            |                 |                |               |            |                   |            |                  |                           |            |            |                                   |     |           |                           |                                 |      |             |         |       |     |       |     |       |     |       |     |       |     |       |     |       |     |       |     |       |     |       |     |       |     |       |     |       |     |       |     |       |     |       |     |       |     |       |     |       |     |       |     |       |     |       |     |       |     |       |     |       |      |
| Application                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | Surface                    |                                   |            |                                                    |            |            |                           |                                                                                     |            |            |            |                |                                                                                                                                                                                                                                         |                |            |                 |                |               |            |                   |            |                  |                           |            |            |                                   |     |           |                           |                                 |      |             |         |       |     |       |     |       |     |       |     |       |     |       |     |       |     |       |     |       |     |       |     |       |     |       |     |       |     |       |     |       |     |       |     |       |     |       |     |       |     |       |     |       |     |       |     |       |     |       |     |       |      |
| <table><thead><tr><th>Control Points</th><th>Head (m)</th><th>Flow (l/s)</th></tr></thead><tbody><tr><td>Design Point (Calculated)</td><td>1.800</td><td>6.0</td></tr><tr><td>Flush-Flo™</td><td>0.453</td><td>5.5</td></tr></tbody></table>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |                            |                                   |            | Control Points                                     | Head (m)   | Flow (l/s) | Design Point (Calculated) | 1.800                                                                               | 6.0        | Flush-Flo™ | 0.453      | 5.5            | <table><thead><tr><th>Control Points</th><th>Head (m)</th><th>Flow (l/s)</th></tr></thead><tbody><tr><td>Kick-Flo®</td><td>0.920</td><td>4.4</td></tr><tr><td>Mean Flow over Head Range</td><td>-</td><td>5.0</td></tr></tbody></table> |                |            |                 | Control Points | Head (m)      | Flow (l/s) | Kick-Flo®         | 0.920      | 4.4              | Mean Flow over Head Range | -          | 5.0        |                                   |     |           |                           |                                 |      |             |         |       |     |       |     |       |     |       |     |       |     |       |     |       |     |       |     |       |     |       |     |       |     |       |     |       |     |       |     |       |     |       |     |       |     |       |     |       |     |       |     |       |     |       |     |       |     |       |     |       |      |
| Control Points                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | Head (m)                   | Flow (l/s)                        |            |                                                    |            |            |                           |                                                                                     |            |            |            |                |                                                                                                                                                                                                                                         |                |            |                 |                |               |            |                   |            |                  |                           |            |            |                                   |     |           |                           |                                 |      |             |         |       |     |       |     |       |     |       |     |       |     |       |     |       |     |       |     |       |     |       |     |       |     |       |     |       |     |       |     |       |     |       |     |       |     |       |     |       |     |       |     |       |     |       |     |       |     |       |     |       |      |
| Design Point (Calculated)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | 1.800                      | 6.0                               |            |                                                    |            |            |                           |                                                                                     |            |            |            |                |                                                                                                                                                                                                                                         |                |            |                 |                |               |            |                   |            |                  |                           |            |            |                                   |     |           |                           |                                 |      |             |         |       |     |       |     |       |     |       |     |       |     |       |     |       |     |       |     |       |     |       |     |       |     |       |     |       |     |       |     |       |     |       |     |       |     |       |     |       |     |       |     |       |     |       |     |       |     |       |     |       |      |
| Flush-Flo™                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | 0.453                      | 5.5                               |            |                                                    |            |            |                           |                                                                                     |            |            |            |                |                                                                                                                                                                                                                                         |                |            |                 |                |               |            |                   |            |                  |                           |            |            |                                   |     |           |                           |                                 |      |             |         |       |     |       |     |       |     |       |     |       |     |       |     |       |     |       |     |       |     |       |     |       |     |       |     |       |     |       |     |       |     |       |     |       |     |       |     |       |     |       |     |       |     |       |     |       |     |       |     |       |      |
| Control Points                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | Head (m)                   | Flow (l/s)                        |            |                                                    |            |            |                           |                                                                                     |            |            |            |                |                                                                                                                                                                                                                                         |                |            |                 |                |               |            |                   |            |                  |                           |            |            |                                   |     |           |                           |                                 |      |             |         |       |     |       |     |       |     |       |     |       |     |       |     |       |     |       |     |       |     |       |     |       |     |       |     |       |     |       |     |       |     |       |     |       |     |       |     |       |     |       |     |       |     |       |     |       |     |       |     |       |      |
| Kick-Flo®                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | 0.920                      | 4.4                               |            |                                                    |            |            |                           |                                                                                     |            |            |            |                |                                                                                                                                                                                                                                         |                |            |                 |                |               |            |                   |            |                  |                           |            |            |                                   |     |           |                           |                                 |      |             |         |       |     |       |     |       |     |       |     |       |     |       |     |       |     |       |     |       |     |       |     |       |     |       |     |       |     |       |     |       |     |       |     |       |     |       |     |       |     |       |     |       |     |       |     |       |     |       |     |       |      |
| Mean Flow over Head Range                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | -                          | 5.0                               |            |                                                    |            |            |                           |                                                                                     |            |            |            |                |                                                                                                                                                                                                                                         |                |            |                 |                |               |            |                   |            |                  |                           |            |            |                                   |     |           |                           |                                 |      |             |         |       |     |       |     |       |     |       |     |       |     |       |     |       |     |       |     |       |     |       |     |       |     |       |     |       |     |       |     |       |     |       |     |       |     |       |     |       |     |       |     |       |     |       |     |       |     |       |     |       |      |
| <p style="text-align: center;">©1982-2020 Innovyze</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |                            |                                   |            |                                                    |            |            |                           |                                                                                     |            |            |            |                |                                                                                                                                                                                                                                         |                |            |                 |                |               |            |                   |            |                  |                           |            |            |                                   |     |           |                           |                                 |      |             |         |       |     |       |     |       |     |       |     |       |     |       |     |       |     |       |     |       |     |       |     |       |     |       |     |       |     |       |     |       |     |       |     |       |     |       |     |       |     |       |     |       |     |       |     |       |     |       |     |       |      |

| Ridge and Partners LLP                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |                            |                                                    |                           | Page 13                                                                             |            |           |            |           |            |           |            |           |            |           |            |           |            |           |            |       |     |       |     |       |     |       |     |       |     |       |      |       |     |       |     |       |     |       |     |       |      |       |      |       |     |       |     |       |     |       |     |       |      |       |      |       |     |       |     |       |     |       |     |       |      |       |      |       |     |       |     |       |     |       |     |       |      |       |      |                |                            |                |     |                 |       |               |     |                   |      |                  |        |            |            |                                   |     |           |                           |                                 |      |             |         |  |  |                |          |            |                |          |            |                           |       |      |           |       |      |            |       |      |                           |   |      |
|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------|----------------------------------------------------|---------------------------|-------------------------------------------------------------------------------------|------------|-----------|------------|-----------|------------|-----------|------------|-----------|------------|-----------|------------|-----------|------------|-----------|------------|-------|-----|-------|-----|-------|-----|-------|-----|-------|-----|-------|------|-------|-----|-------|-----|-------|-----|-------|-----|-------|------|-------|------|-------|-----|-------|-----|-------|-----|-------|-----|-------|------|-------|------|-------|-----|-------|-----|-------|-----|-------|-----|-------|------|-------|------|-------|-----|-------|-----|-------|-----|-------|-----|-------|------|-------|------|----------------|----------------------------|----------------|-----|-----------------|-------|---------------|-----|-------------------|------|------------------|--------|------------|------------|-----------------------------------|-----|-----------|---------------------------|---------------------------------|------|-------------|---------|--|--|----------------|----------|------------|----------------|----------|------------|---------------------------|-------|------|-----------|-------|------|------------|-------|------|---------------------------|---|------|
| The Cowyards<br>Blenheim Park, Oxford Road<br>Woodstock OX20 1QR                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |                            | Atlas Park<br>Proposed SW<br>Drainage Calculations |                           |  |            |           |            |           |            |           |            |           |            |           |            |           |            |           |            |       |     |       |     |       |     |       |     |       |     |       |      |       |     |       |     |       |     |       |     |       |      |       |      |       |     |       |     |       |     |       |     |       |      |       |      |       |     |       |     |       |     |       |     |       |      |       |      |       |     |       |     |       |     |       |     |       |      |       |      |                |                            |                |     |                 |       |               |     |                   |      |                  |        |            |            |                                   |     |           |                           |                                 |      |             |         |  |  |                |          |            |                |          |            |                           |       |      |           |       |      |            |       |      |                           |   |      |
| Date 14/06/2023<br>File Proposed SW Network GFRO.MDX                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |                            | Designed by LMc<br>Checked by PB                   |                           |                                                                                     |            |           |            |           |            |           |            |           |            |           |            |           |            |           |            |       |     |       |     |       |     |       |     |       |     |       |      |       |     |       |     |       |     |       |     |       |      |       |      |       |     |       |     |       |     |       |     |       |      |       |      |       |     |       |     |       |     |       |     |       |      |       |      |       |     |       |     |       |     |       |     |       |      |       |      |                |                            |                |     |                 |       |               |     |                   |      |                  |        |            |            |                                   |     |           |                           |                                 |      |             |         |  |  |                |          |            |                |          |            |                           |       |      |           |       |      |            |       |      |                           |   |      |
| Innovyze                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |                            | Network 2020.1                                     |                           |                                                                                     |            |           |            |           |            |           |            |           |            |           |            |           |            |           |            |       |     |       |     |       |     |       |     |       |     |       |      |       |     |       |     |       |     |       |     |       |      |       |      |       |     |       |     |       |     |       |     |       |      |       |      |       |     |       |     |       |     |       |     |       |      |       |      |       |     |       |     |       |     |       |     |       |      |       |      |                |                            |                |     |                 |       |               |     |                   |      |                  |        |            |            |                                   |     |           |                           |                                 |      |             |         |  |  |                |          |            |                |          |            |                           |       |      |           |       |      |            |       |      |                           |   |      |
| <p><u>Hydro-Brake® Optimum Manhole: 32, DS/PN: 11.004, Volume (m³): 10.8</u></p> <p>The hydrological calculations have been based on the Head/Discharge relationship for the Hydro-Brake® Optimum as specified. Should another type of control device other than a Hydro-Brake Optimum® be utilised then these storage routing calculations will be invalidated</p> <table><tr><th>Depth (m)</th><th>Flow (l/s)</th><th>Depth (m)</th><th>Flow (l/s)</th><th>Depth (m)</th><th>Flow (l/s)</th><th>Depth (m)</th><th>Flow (l/s)</th><th>Depth (m)</th><th>Flow (l/s)</th><th>Depth (m)</th><th>Flow (l/s)</th></tr><tr><td>0.100</td><td>3.5</td><td>0.600</td><td>5.4</td><td>1.600</td><td>5.7</td><td>2.600</td><td>7.1</td><td>5.000</td><td>9.7</td><td>7.500</td><td>11.8</td></tr><tr><td>0.200</td><td>4.9</td><td>0.800</td><td>5.0</td><td>1.800</td><td>6.0</td><td>3.000</td><td>7.6</td><td>5.500</td><td>10.2</td><td>8.000</td><td>12.1</td></tr><tr><td>0.300</td><td>5.3</td><td>1.000</td><td>4.6</td><td>2.000</td><td>6.3</td><td>3.500</td><td>8.2</td><td>6.000</td><td>10.6</td><td>8.500</td><td>12.5</td></tr><tr><td>0.400</td><td>5.5</td><td>1.200</td><td>5.0</td><td>2.200</td><td>6.6</td><td>4.000</td><td>8.7</td><td>6.500</td><td>11.0</td><td>9.000</td><td>12.8</td></tr><tr><td>0.500</td><td>5.5</td><td>1.400</td><td>5.3</td><td>2.400</td><td>6.9</td><td>4.500</td><td>9.2</td><td>7.000</td><td>11.4</td><td>9.500</td><td>13.2</td></tr></table> <p><u>Hydro-Brake® Optimum Manhole: 34, DS/PN: 1.006, Volume (m³): 24.5</u></p> <table><tr><td>Unit Reference</td><td>MD-SHE-0243-3700-2150-3700</td><td>Sump Available</td><td>Yes</td></tr><tr><td>Design Head (m)</td><td>2.150</td><td>Diameter (mm)</td><td>243</td></tr><tr><td>Design Flow (l/s)</td><td>37.0</td><td>Invert Level (m)</td><td>65.210</td></tr><tr><td>Flush-Flo™</td><td>Calculated</td><td>Minimum Outlet Pipe Diameter (mm)</td><td>300</td></tr><tr><td>Objective</td><td>Minimise upstream storage</td><td>Suggested Manhole Diameter (mm)</td><td>2100</td></tr><tr><td>Application</td><td>Surface</td><td></td><td></td></tr></table> <table><tr><th>Control Points</th><th>Head (m)</th><th>Flow (l/s)</th><th>Control Points</th><th>Head (m)</th><th>Flow (l/s)</th></tr><tr><td>Design Point (Calculated)</td><td>2.150</td><td>37.0</td><td>Kick-Flo®</td><td>1.360</td><td>29.7</td></tr><tr><td>Flush-Flo™</td><td>0.631</td><td>36.8</td><td>Mean Flow over Head Range</td><td>-</td><td>31.9</td></tr></table> <p>The hydrological calculations have been based on the Head/Discharge relationship for the Hydro-Brake® Optimum as specified. Should another type of control device other than a Hydro-Brake Optimum® be utilised then these storage routing calculations will be invalidated</p> |                            |                                                    |                           |                                                                                     |            |           |            | Depth (m) | Flow (l/s) | Depth (m) | Flow (l/s) | Depth (m) | Flow (l/s) | Depth (m) | Flow (l/s) | Depth (m) | Flow (l/s) | Depth (m) | Flow (l/s) | 0.100 | 3.5 | 0.600 | 5.4 | 1.600 | 5.7 | 2.600 | 7.1 | 5.000 | 9.7 | 7.500 | 11.8 | 0.200 | 4.9 | 0.800 | 5.0 | 1.800 | 6.0 | 3.000 | 7.6 | 5.500 | 10.2 | 8.000 | 12.1 | 0.300 | 5.3 | 1.000 | 4.6 | 2.000 | 6.3 | 3.500 | 8.2 | 6.000 | 10.6 | 8.500 | 12.5 | 0.400 | 5.5 | 1.200 | 5.0 | 2.200 | 6.6 | 4.000 | 8.7 | 6.500 | 11.0 | 9.000 | 12.8 | 0.500 | 5.5 | 1.400 | 5.3 | 2.400 | 6.9 | 4.500 | 9.2 | 7.000 | 11.4 | 9.500 | 13.2 | Unit Reference | MD-SHE-0243-3700-2150-3700 | Sump Available | Yes | Design Head (m) | 2.150 | Diameter (mm) | 243 | Design Flow (l/s) | 37.0 | Invert Level (m) | 65.210 | Flush-Flo™ | Calculated | Minimum Outlet Pipe Diameter (mm) | 300 | Objective | Minimise upstream storage | Suggested Manhole Diameter (mm) | 2100 | Application | Surface |  |  | Control Points | Head (m) | Flow (l/s) | Control Points | Head (m) | Flow (l/s) | Design Point (Calculated) | 2.150 | 37.0 | Kick-Flo® | 1.360 | 29.7 | Flush-Flo™ | 0.631 | 36.8 | Mean Flow over Head Range | - | 31.9 |
| Depth (m)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | Flow (l/s)                 | Depth (m)                                          | Flow (l/s)                | Depth (m)                                                                           | Flow (l/s) | Depth (m) | Flow (l/s) | Depth (m) | Flow (l/s) | Depth (m) | Flow (l/s) |           |            |           |            |           |            |           |            |       |     |       |     |       |     |       |     |       |     |       |      |       |     |       |     |       |     |       |     |       |      |       |      |       |     |       |     |       |     |       |     |       |      |       |      |       |     |       |     |       |     |       |     |       |      |       |      |       |     |       |     |       |     |       |     |       |      |       |      |                |                            |                |     |                 |       |               |     |                   |      |                  |        |            |            |                                   |     |           |                           |                                 |      |             |         |  |  |                |          |            |                |          |            |                           |       |      |           |       |      |            |       |      |                           |   |      |
| 0.100                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | 3.5                        | 0.600                                              | 5.4                       | 1.600                                                                               | 5.7        | 2.600     | 7.1        | 5.000     | 9.7        | 7.500     | 11.8       |           |            |           |            |           |            |           |            |       |     |       |     |       |     |       |     |       |     |       |      |       |     |       |     |       |     |       |     |       |      |       |      |       |     |       |     |       |     |       |     |       |      |       |      |       |     |       |     |       |     |       |     |       |      |       |      |       |     |       |     |       |     |       |     |       |      |       |      |                |                            |                |     |                 |       |               |     |                   |      |                  |        |            |            |                                   |     |           |                           |                                 |      |             |         |  |  |                |          |            |                |          |            |                           |       |      |           |       |      |            |       |      |                           |   |      |
| 0.200                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | 4.9                        | 0.800                                              | 5.0                       | 1.800                                                                               | 6.0        | 3.000     | 7.6        | 5.500     | 10.2       | 8.000     | 12.1       |           |            |           |            |           |            |           |            |       |     |       |     |       |     |       |     |       |     |       |      |       |     |       |     |       |     |       |     |       |      |       |      |       |     |       |     |       |     |       |     |       |      |       |      |       |     |       |     |       |     |       |     |       |      |       |      |       |     |       |     |       |     |       |     |       |      |       |      |                |                            |                |     |                 |       |               |     |                   |      |                  |        |            |            |                                   |     |           |                           |                                 |      |             |         |  |  |                |          |            |                |          |            |                           |       |      |           |       |      |            |       |      |                           |   |      |
| 0.300                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | 5.3                        | 1.000                                              | 4.6                       | 2.000                                                                               | 6.3        | 3.500     | 8.2        | 6.000     | 10.6       | 8.500     | 12.5       |           |            |           |            |           |            |           |            |       |     |       |     |       |     |       |     |       |     |       |      |       |     |       |     |       |     |       |     |       |      |       |      |       |     |       |     |       |     |       |     |       |      |       |      |       |     |       |     |       |     |       |     |       |      |       |      |       |     |       |     |       |     |       |     |       |      |       |      |                |                            |                |     |                 |       |               |     |                   |      |                  |        |            |            |                                   |     |           |                           |                                 |      |             |         |  |  |                |          |            |                |          |            |                           |       |      |           |       |      |            |       |      |                           |   |      |
| 0.400                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | 5.5                        | 1.200                                              | 5.0                       | 2.200                                                                               | 6.6        | 4.000     | 8.7        | 6.500     | 11.0       | 9.000     | 12.8       |           |            |           |            |           |            |           |            |       |     |       |     |       |     |       |     |       |     |       |      |       |     |       |     |       |     |       |     |       |      |       |      |       |     |       |     |       |     |       |     |       |      |       |      |       |     |       |     |       |     |       |     |       |      |       |      |       |     |       |     |       |     |       |     |       |      |       |      |                |                            |                |     |                 |       |               |     |                   |      |                  |        |            |            |                                   |     |           |                           |                                 |      |             |         |  |  |                |          |            |                |          |            |                           |       |      |           |       |      |            |       |      |                           |   |      |
| 0.500                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | 5.5                        | 1.400                                              | 5.3                       | 2.400                                                                               | 6.9        | 4.500     | 9.2        | 7.000     | 11.4       | 9.500     | 13.2       |           |            |           |            |           |            |           |            |       |     |       |     |       |     |       |     |       |     |       |      |       |     |       |     |       |     |       |     |       |      |       |      |       |     |       |     |       |     |       |     |       |      |       |      |       |     |       |     |       |     |       |     |       |      |       |      |       |     |       |     |       |     |       |     |       |      |       |      |                |                            |                |     |                 |       |               |     |                   |      |                  |        |            |            |                                   |     |           |                           |                                 |      |             |         |  |  |                |          |            |                |          |            |                           |       |      |           |       |      |            |       |      |                           |   |      |
| Unit Reference                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | MD-SHE-0243-3700-2150-3700 | Sump Available                                     | Yes                       |                                                                                     |            |           |            |           |            |           |            |           |            |           |            |           |            |           |            |       |     |       |     |       |     |       |     |       |     |       |      |       |     |       |     |       |     |       |     |       |      |       |      |       |     |       |     |       |     |       |     |       |      |       |      |       |     |       |     |       |     |       |     |       |      |       |      |       |     |       |     |       |     |       |     |       |      |       |      |                |                            |                |     |                 |       |               |     |                   |      |                  |        |            |            |                                   |     |           |                           |                                 |      |             |         |  |  |                |          |            |                |          |            |                           |       |      |           |       |      |            |       |      |                           |   |      |
| Design Head (m)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | 2.150                      | Diameter (mm)                                      | 243                       |                                                                                     |            |           |            |           |            |           |            |           |            |           |            |           |            |           |            |       |     |       |     |       |     |       |     |       |     |       |      |       |     |       |     |       |     |       |     |       |      |       |      |       |     |       |     |       |     |       |     |       |      |       |      |       |     |       |     |       |     |       |     |       |      |       |      |       |     |       |     |       |     |       |     |       |      |       |      |                |                            |                |     |                 |       |               |     |                   |      |                  |        |            |            |                                   |     |           |                           |                                 |      |             |         |  |  |                |          |            |                |          |            |                           |       |      |           |       |      |            |       |      |                           |   |      |
| Design Flow (l/s)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | 37.0                       | Invert Level (m)                                   | 65.210                    |                                                                                     |            |           |            |           |            |           |            |           |            |           |            |           |            |           |            |       |     |       |     |       |     |       |     |       |     |       |      |       |     |       |     |       |     |       |     |       |      |       |      |       |     |       |     |       |     |       |     |       |      |       |      |       |     |       |     |       |     |       |     |       |      |       |      |       |     |       |     |       |     |       |     |       |      |       |      |                |                            |                |     |                 |       |               |     |                   |      |                  |        |            |            |                                   |     |           |                           |                                 |      |             |         |  |  |                |          |            |                |          |            |                           |       |      |           |       |      |            |       |      |                           |   |      |
| Flush-Flo™                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | Calculated                 | Minimum Outlet Pipe Diameter (mm)                  | 300                       |                                                                                     |            |           |            |           |            |           |            |           |            |           |            |           |            |           |            |       |     |       |     |       |     |       |     |       |     |       |      |       |     |       |     |       |     |       |     |       |      |       |      |       |     |       |     |       |     |       |     |       |      |       |      |       |     |       |     |       |     |       |     |       |      |       |      |       |     |       |     |       |     |       |     |       |      |       |      |                |                            |                |     |                 |       |               |     |                   |      |                  |        |            |            |                                   |     |           |                           |                                 |      |             |         |  |  |                |          |            |                |          |            |                           |       |      |           |       |      |            |       |      |                           |   |      |
| Objective                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | Minimise upstream storage  | Suggested Manhole Diameter (mm)                    | 2100                      |                                                                                     |            |           |            |           |            |           |            |           |            |           |            |           |            |           |            |       |     |       |     |       |     |       |     |       |     |       |      |       |     |       |     |       |     |       |     |       |      |       |      |       |     |       |     |       |     |       |     |       |      |       |      |       |     |       |     |       |     |       |     |       |      |       |      |       |     |       |     |       |     |       |     |       |      |       |      |                |                            |                |     |                 |       |               |     |                   |      |                  |        |            |            |                                   |     |           |                           |                                 |      |             |         |  |  |                |          |            |                |          |            |                           |       |      |           |       |      |            |       |      |                           |   |      |
| Application                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | Surface                    |                                                    |                           |                                                                                     |            |           |            |           |            |           |            |           |            |           |            |           |            |           |            |       |     |       |     |       |     |       |     |       |     |       |      |       |     |       |     |       |     |       |     |       |      |       |      |       |     |       |     |       |     |       |     |       |      |       |      |       |     |       |     |       |     |       |     |       |      |       |      |       |     |       |     |       |     |       |     |       |      |       |      |                |                            |                |     |                 |       |               |     |                   |      |                  |        |            |            |                                   |     |           |                           |                                 |      |             |         |  |  |                |          |            |                |          |            |                           |       |      |           |       |      |            |       |      |                           |   |      |
| Control Points                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | Head (m)                   | Flow (l/s)                                         | Control Points            | Head (m)                                                                            | Flow (l/s) |           |            |           |            |           |            |           |            |           |            |           |            |           |            |       |     |       |     |       |     |       |     |       |     |       |      |       |     |       |     |       |     |       |     |       |      |       |      |       |     |       |     |       |     |       |     |       |      |       |      |       |     |       |     |       |     |       |     |       |      |       |      |       |     |       |     |       |     |       |     |       |      |       |      |                |                            |                |     |                 |       |               |     |                   |      |                  |        |            |            |                                   |     |           |                           |                                 |      |             |         |  |  |                |          |            |                |          |            |                           |       |      |           |       |      |            |       |      |                           |   |      |
| Design Point (Calculated)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | 2.150                      | 37.0                                               | Kick-Flo®                 | 1.360                                                                               | 29.7       |           |            |           |            |           |            |           |            |           |            |           |            |           |            |       |     |       |     |       |     |       |     |       |     |       |      |       |     |       |     |       |     |       |     |       |      |       |      |       |     |       |     |       |     |       |     |       |      |       |      |       |     |       |     |       |     |       |     |       |      |       |      |       |     |       |     |       |     |       |     |       |      |       |      |                |                            |                |     |                 |       |               |     |                   |      |                  |        |            |            |                                   |     |           |                           |                                 |      |             |         |  |  |                |          |            |                |          |            |                           |       |      |           |       |      |            |       |      |                           |   |      |
| Flush-Flo™                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | 0.631                      | 36.8                                               | Mean Flow over Head Range | -                                                                                   | 31.9       |           |            |           |            |           |            |           |            |           |            |           |            |           |            |       |     |       |     |       |     |       |     |       |     |       |      |       |     |       |     |       |     |       |     |       |      |       |      |       |     |       |     |       |     |       |     |       |      |       |      |       |     |       |     |       |     |       |     |       |      |       |      |       |     |       |     |       |     |       |     |       |      |       |      |                |                            |                |     |                 |       |               |     |                   |      |                  |        |            |            |                                   |     |           |                           |                                 |      |             |         |  |  |                |          |            |                |          |            |                           |       |      |           |       |      |            |       |      |                           |   |      |
| ©1982-2020 Innovyze                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |                            |                                                    |                           |                                                                                     |            |           |            |           |            |           |            |           |            |           |            |           |            |           |            |       |     |       |     |       |     |       |     |       |     |       |      |       |     |       |     |       |     |       |     |       |      |       |      |       |     |       |     |       |     |       |     |       |      |       |      |       |     |       |     |       |     |       |     |       |      |       |      |       |     |       |     |       |     |       |     |       |      |       |      |                |                            |                |     |                 |       |               |     |                   |      |                  |        |            |            |                                   |     |           |                           |                                 |      |             |         |  |  |                |          |            |                |          |            |                           |       |      |           |       |      |            |       |      |                           |   |      |



|                                                                  |                                                    |                                                                                     |
|------------------------------------------------------------------|----------------------------------------------------|-------------------------------------------------------------------------------------|
| Ridge and Partners LLP                                           |                                                    | Page 15                                                                             |
| The Cowyards<br>Blenheim Park, Oxford Road<br>Woodstock OX20 1QR | Atlas Park<br>Proposed SW<br>Drainage Calculations |  |
| Date 14/06/2023<br>File Proposed SW Network GFRO.MDX             | Designed by LMc<br>Checked by PB                   |                                                                                     |
| Innovyze                                                         | Network 2020.1                                     |                                                                                     |

Storage Structures for 1.000

Cellular Storage Manhole: 4, DS/PN: 1.003

Invert Level (m) 66.400 Infiltration Coefficient Side (m/hr) 0.00000 Porosity 0.95  
Infiltration Coefficient Base (m/hr) 0.00000 Safety Factor 2.0

| Depth (m) | Area (m²) | Inf. Area (m²) | Depth (m) | Area (m²) | Inf. Area (m²) | Depth (m) | Area (m²) | Inf. Area (m²) |
|-----------|-----------|----------------|-----------|-----------|----------------|-----------|-----------|----------------|
| 0.000     | 1250.0    | 0.0            | 1.600     | 1250.0    | 0.0            | 1.601     | 0.0       | 0.0            |

Cellular Storage Manhole: 8, DS/PN: 2.002

Invert Level (m) 66.971 Infiltration Coefficient Side (m/hr) 0.00000 Porosity 0.95  
Infiltration Coefficient Base (m/hr) 0.00000 Safety Factor 2.0

| Depth (m) | Area (m²) | Inf. Area (m²) | Depth (m) | Area (m²) | Inf. Area (m²) | Depth (m) | Area (m²) | Inf. Area (m²) |
|-----------|-----------|----------------|-----------|-----------|----------------|-----------|-----------|----------------|
| 0.000     | 780.0     | 0.0            | 1.200     | 780.0     | 0.0            | 1.201     | 0.0       | 0.0            |

Cellular Storage Manhole: 16, DS/PN: 6.002

Invert Level (m) 66.700 Infiltration Coefficient Side (m/hr) 0.00000 Porosity 0.95  
Infiltration Coefficient Base (m/hr) 0.00000 Safety Factor 2.0

| Depth (m) | Area (m²) | Inf. Area (m²) | Depth (m) | Area (m²) | Inf. Area (m²) | Depth (m) | Area (m²) | Inf. Area (m²) |
|-----------|-----------|----------------|-----------|-----------|----------------|-----------|-----------|----------------|
| 0.000     | 440.0     | 0.0            | 1.200     | 440.0     | 0.0            | 1.201     | 0.0       | 0.0            |

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| Ridge and Partners LLP                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |                                                    | Page 16                                                                             |           |           |                |           |           |                |           |           |                |       |       |     |       |       |     |       |     |     |           |           |                |           |           |                |           |           |                |       |       |     |       |       |     |       |     |     |           |           |                |           |           |                |           |           |                |       |       |     |       |       |     |       |     |     |
|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------|-------------------------------------------------------------------------------------|-----------|-----------|----------------|-----------|-----------|----------------|-----------|-----------|----------------|-------|-------|-----|-------|-------|-----|-------|-----|-----|-----------|-----------|----------------|-----------|-----------|----------------|-----------|-----------|----------------|-------|-------|-----|-------|-------|-----|-------|-----|-----|-----------|-----------|----------------|-----------|-----------|----------------|-----------|-----------|----------------|-------|-------|-----|-------|-------|-----|-------|-----|-----|
| The Cowyards<br>Blenheim Park, Oxford Road<br>Woodstock OX20 1QR                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | Atlas Park<br>Proposed SW<br>Drainage Calculations |  |           |           |                |           |           |                |           |           |                |       |       |     |       |       |     |       |     |     |           |           |                |           |           |                |           |           |                |       |       |     |       |       |     |       |     |     |           |           |                |           |           |                |           |           |                |       |       |     |       |       |     |       |     |     |
| Date 14/06/2023<br>File Proposed SW Network GFRO.MDX                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | Designed by LMc<br>Checked by PB                   |                                                                                     |           |           |                |           |           |                |           |           |                |       |       |     |       |       |     |       |     |     |           |           |                |           |           |                |           |           |                |       |       |     |       |       |     |       |     |     |           |           |                |           |           |                |           |           |                |       |       |     |       |       |     |       |     |     |
| Innovyze                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | Network 2020.1                                     |                                                                                     |           |           |                |           |           |                |           |           |                |       |       |     |       |       |     |       |     |     |           |           |                |           |           |                |           |           |                |       |       |     |       |       |     |       |     |     |           |           |                |           |           |                |           |           |                |       |       |     |       |       |     |       |     |     |
| <p style="text-align: center;"><u>Cellular Storage Manhole: 19, DS/PN: 9.000</u></p> <p style="text-align: right;">Invert Level (m) 67.000 Infiltration Coefficient Side (m/hr) 0.00000 Porosity 0.95<br/>Infiltration Coefficient Base (m/hr) 0.00000 Safety Factor 2.0</p> <table><tr><th>Depth (m)</th><th>Area (m²)</th><th>Inf. Area (m²)</th><th>Depth (m)</th><th>Area (m²)</th><th>Inf. Area (m²)</th><th>Depth (m)</th><th>Area (m²)</th><th>Inf. Area (m²)</th></tr><tr><td>0.000</td><td>280.0</td><td>0.0</td><td>1.200</td><td>280.0</td><td>0.0</td><td>1.201</td><td>0.0</td><td>0.0</td></tr></table> <p style="text-align: center;"><u>Cellular Storage Manhole: 27, DS/PN: 11.001</u></p> <p style="text-align: right;">Invert Level (m) 66.327 Infiltration Coefficient Side (m/hr) 0.00000 Porosity 0.95<br/>Infiltration Coefficient Base (m/hr) 0.00000 Safety Factor 2.0</p> <table><tr><th>Depth (m)</th><th>Area (m²)</th><th>Inf. Area (m²)</th><th>Depth (m)</th><th>Area (m²)</th><th>Inf. Area (m²)</th><th>Depth (m)</th><th>Area (m²)</th><th>Inf. Area (m²)</th></tr><tr><td>0.000</td><td>680.0</td><td>0.0</td><td>0.800</td><td>680.0</td><td>0.0</td><td>0.801</td><td>0.0</td><td>0.0</td></tr></table> <p style="text-align: center;"><u>Cellular Storage Manhole: 29, DS/PN: 11.003</u></p> <p style="text-align: right;">Invert Level (m) 65.941 Infiltration Coefficient Side (m/hr) 0.00000 Porosity 0.95<br/>Infiltration Coefficient Base (m/hr) 0.00000 Safety Factor 2.0</p> <table><tr><th>Depth (m)</th><th>Area (m²)</th><th>Inf. Area (m²)</th><th>Depth (m)</th><th>Area (m²)</th><th>Inf. Area (m²)</th><th>Depth (m)</th><th>Area (m²)</th><th>Inf. Area (m²)</th></tr><tr><td>0.000</td><td>550.0</td><td>0.0</td><td>1.600</td><td>550.0</td><td>0.0</td><td>1.601</td><td>0.0</td><td>0.0</td></tr></table> |                                                    |                                                                                     | Depth (m) | Area (m²) | Inf. Area (m²) | Depth (m) | Area (m²) | Inf. Area (m²) | Depth (m) | Area (m²) | Inf. Area (m²) | 0.000 | 280.0 | 0.0 | 1.200 | 280.0 | 0.0 | 1.201 | 0.0 | 0.0 | Depth (m) | Area (m²) | Inf. Area (m²) | Depth (m) | Area (m²) | Inf. Area (m²) | Depth (m) | Area (m²) | Inf. Area (m²) | 0.000 | 680.0 | 0.0 | 0.800 | 680.0 | 0.0 | 0.801 | 0.0 | 0.0 | Depth (m) | Area (m²) | Inf. Area (m²) | Depth (m) | Area (m²) | Inf. Area (m²) | Depth (m) | Area (m²) | Inf. Area (m²) | 0.000 | 550.0 | 0.0 | 1.600 | 550.0 | 0.0 | 1.601 | 0.0 | 0.0 |
| Depth (m)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | Area (m²)                                          | Inf. Area (m²)                                                                      | Depth (m) | Area (m²) | Inf. Area (m²) | Depth (m) | Area (m²) | Inf. Area (m²) |           |           |                |       |       |     |       |       |     |       |     |     |           |           |                |           |           |                |           |           |                |       |       |     |       |       |     |       |     |     |           |           |                |           |           |                |           |           |                |       |       |     |       |       |     |       |     |     |
| 0.000                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | 280.0                                              | 0.0                                                                                 | 1.200     | 280.0     | 0.0            | 1.201     | 0.0       | 0.0            |           |           |                |       |       |     |       |       |     |       |     |     |           |           |                |           |           |                |           |           |                |       |       |     |       |       |     |       |     |     |           |           |                |           |           |                |           |           |                |       |       |     |       |       |     |       |     |     |
| Depth (m)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | Area (m²)                                          | Inf. Area (m²)                                                                      | Depth (m) | Area (m²) | Inf. Area (m²) | Depth (m) | Area (m²) | Inf. Area (m²) |           |           |                |       |       |     |       |       |     |       |     |     |           |           |                |           |           |                |           |           |                |       |       |     |       |       |     |       |     |     |           |           |                |           |           |                |           |           |                |       |       |     |       |       |     |       |     |     |
| 0.000                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | 680.0                                              | 0.0                                                                                 | 0.800     | 680.0     | 0.0            | 0.801     | 0.0       | 0.0            |           |           |                |       |       |     |       |       |     |       |     |     |           |           |                |           |           |                |           |           |                |       |       |     |       |       |     |       |     |     |           |           |                |           |           |                |           |           |                |       |       |     |       |       |     |       |     |     |
| Depth (m)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | Area (m²)                                          | Inf. Area (m²)                                                                      | Depth (m) | Area (m²) | Inf. Area (m²) | Depth (m) | Area (m²) | Inf. Area (m²) |           |           |                |       |       |     |       |       |     |       |     |     |           |           |                |           |           |                |           |           |                |       |       |     |       |       |     |       |     |     |           |           |                |           |           |                |           |           |                |       |       |     |       |       |     |       |     |     |
| 0.000                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | 550.0                                              | 0.0                                                                                 | 1.600     | 550.0     | 0.0            | 1.601     | 0.0       | 0.0            |           |           |                |       |       |     |       |       |     |       |     |     |           |           |                |           |           |                |           |           |                |       |       |     |       |       |     |       |     |     |           |           |                |           |           |                |           |           |                |       |       |     |       |       |     |       |     |     |
| ©1982-2020 Innovyze                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |                                                    |                                                                                     |           |           |                |           |           |                |           |           |                |       |       |     |       |       |     |       |     |     |           |           |                |           |           |                |           |           |                |       |       |     |       |       |     |       |     |     |           |           |                |           |           |                |           |           |                |       |       |     |       |       |     |       |     |     |



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|----------------------------------------------------------------------------------------------------|----------------------------------------------------|--|-------------------------------------------------------------------------------------|
| Ridge and Partners LLP                                                                             |                                                    |  | Page 18                                                                             |
| The Cowyards<br>Blenheim Park, Oxford Road<br>Woodstock OX20 1QR                                   | Atlas Park<br>Proposed SW<br>Drainage Calculations |  |  |
| Date 14/06/2023<br>File Proposed SW Network GFRO.MDX                                               | Designed by LMc<br>Checked by PB                   |  |                                                                                     |
| Innovyze                                                                                           | Network 2020.1                                     |  |                                                                                     |
| <p><u>1 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for 1.000</u></p> |                                                    |  |                                                                                     |
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1 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for 1.000

|        |       |       |        |        |         |           |           |           |          | Water  | Surcharged | Flooded | Half Drain |          |        |
|--------|-------|-------|--------|--------|---------|-----------|-----------|-----------|----------|--------|------------|---------|------------|----------|--------|
|        | US/MH |       |        | Return | Climate | First (X) | First (Y) | First (Z) | Overflow | Level  | Depth      | Volume  | Flow /     | Overflow | Time   |
| PN     | Name  | Storm |        | Period | Change  | Surcharge | Flood     | Overflow  | Act.     | (m)    | (m)        | (m³)    | Cap.       | (1/s)    | (mins) |
| 1.002  | 3     | 15    | Winter | 1      | +0%     | 30/60     | Summer    |           |          | 66.674 | -0.396     | 0.000   | 0.25       |          |        |
| 1.003  | 4     | 480   | Winter | 1      | +0%     | 30/60     | Summer    |           |          | 66.622 | -0.268     | 0.000   | 0.03       |          | 415    |
| 2.000  | 5     | 30    | Winter | 1      | +0%     | 100/15    | Summer    |           |          | 67.684 | -0.190     | 0.000   | 0.29       |          |        |
| 2.001  | 6     | 30    | Winter | 1      | +0%     | 30/480    | Winter    |           |          | 67.556 | -0.210     | 0.000   | 0.20       |          |        |
| 3.000  | 7     | 30    | Winter | 1      | +0%     | 100/60    | Winter    |           |          | 67.416 | -0.435     | 0.000   | 0.07       |          |        |
| 2.002  | 8     | 360   | Winter | 1      | +0%     | 30/60     | Winter    |           |          | 67.157 | -0.339     | 0.000   | 0.03       |          | 304    |
| 4.000  | 9     | 30    | Winter | 1      | +0%     |           |           |           |          | 68.417 | -0.299     | 0.000   | 0.09       |          |        |
| 2.003  | 10    | 360   | Winter | 1      | +0%     | 1/15      | Winter    |           |          | 67.155 | 0.020      | 0.000   | 0.12       |          |        |
| 5.000  | 11    | 30    | Winter | 1      | +0%     |           |           |           |          | 66.743 | -0.872     | 0.000   | 0.01       |          |        |
| 2.004  | 12    | 120   | Winter | 1      | +0%     | 100/60    | Winter    |           |          | 66.555 | -0.730     | 0.000   | 0.02       |          |        |
| 6.000  | 13    | 30    | Winter | 1      | +0%     |           |           |           |          | 67.908 | -0.337     | 0.000   | 0.14       |          |        |
| 6.001  | 14    | 30    | Winter | 1      | +0%     | 100/360   | Winter    |           |          | 67.504 | -0.346     | 0.000   | 0.12       |          |        |
| 7.000  | 15    | 30    | Winter | 1      | +0%     | 30/30     | Winter    |           |          | 66.917 | -0.365     | 0.000   | 0.08       |          |        |
| 6.002  | 16    | 240   | Winter | 1      | +0%     | 1/15      | Summer    |           |          | 66.864 | 0.152      | 0.000   | 0.35       |          | 194    |
| 8.000  | 17    | 30    | Winter | 1      | +0%     | 30/15     | Summer    |           |          | 67.821 | -0.233     | 0.000   | 0.31       |          |        |
| 8.001  | 18    | 30    | Winter | 1      | +0%     | 30/15     | Summer    |           |          | 67.675 | -0.279     | 0.000   | 0.15       |          |        |
| 9.000  | 19    | 120   | Winter | 1      | +0%     | 30/15     | Winter    |           |          | 67.152 | -0.223     | 0.000   | 0.04       |          | 106    |
| 8.002  | 20    | 30    | Winter | 1      | +0%     | 1/15      | Summer    |           |          | 67.381 | 0.386      | 0.000   | 0.31       |          |        |
| 10.000 | 21    | 30    | Winter | 1      | +0%     | 30/60     | Winter    |           |          | 67.052 | -0.188     | 0.000   | 0.06       |          |        |
| 8.003  | 22    | 15    | Winter | 1      | +0%     | 30/30     | Winter    |           |          | 66.802 | -0.284     | 0.000   | 0.13       |          |        |
| 6.003  | 23    | 15    | Winter | 1      | +0%     | 30/30     | Summer    |           |          | 66.613 | -0.308     | 0.000   | 0.22       |          |        |
| 2.005  | 24    | 120   | Winter | 1      | +0%     | 30/30     | Winter    |           |          | 66.552 | -0.306     | 0.000   | 0.04       |          |        |
| 1.004  | 25    | 120   | Winter | 1      | +0%     | 30/30     | Winter    |           |          | 66.484 | -0.293     | 0.000   | 0.03       |          |        |
| 11.000 | 26    | 15    | Summer | 1      | +0%     | 100/480   | Winter    |           |          | 66.750 | -0.450     | 0.000   | 0.00       |          |        |
| 11.001 | 27    | 1440  | Winter | 1      | +0%     | 30/240    | Winter    |           |          | 66.482 | -0.295     | 0.000   | 0.02       |          | 602    |

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| Ridge and Partners LLP                                                                      |  |                                                    |  | Page 20                                                                             |  |
| The Cowyards<br>Blenheim Park, Oxford Road<br>Woodstock OX20 1QR                            |  | Atlas Park<br>Proposed SW<br>Drainage Calculations |  |  |  |
| Date 14/06/2023<br>File Proposed SW Network GFRO.MDX                                        |  | Designed by LMc<br>Checked by PB                   |  |                                                                                     |  |
| Innovyze                                                                                    |  | Network 2020.1                                     |  |                                                                                     |  |
| <u>1 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for 1.000</u> |  |                                                    |  |                                                                                     |  |
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| Ridge and Partners LLP                                                                                                                                                                                                                                                                                           |            |                                                    |        | Page 21                                                                             |  |    |      |  |        |       |  |            |            |          |  |        |    |     |    |  |  |
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| The Cowyards<br>Blenheim Park, Oxford Road<br>Woodstock OX20 1QR                                                                                                                                                                                                                                                 |            | Atlas Park<br>Proposed SW<br>Drainage Calculations |        |  |  |    |      |  |        |       |  |            |            |          |  |        |    |     |    |  |  |
| Date 14/06/2023<br>File Proposed SW Network GFRO.MDX                                                                                                                                                                                                                                                             |            | Designed by LMc<br>Checked by PB                   |        |                                                                                     |  |    |      |  |        |       |  |            |            |          |  |        |    |     |    |  |  |
| Innovyze                                                                                                                                                                                                                                                                                                         |            | Network 2020.1                                     |        |                                                                                     |  |    |      |  |        |       |  |            |            |          |  |        |    |     |    |  |  |
| <u>1 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for 1.000</u>                                                                                                                                                                                                                      |            |                                                    |        |                                                                                     |  |    |      |  |        |       |  |            |            |          |  |        |    |     |    |  |  |
| <table><thead><tr><th rowspan="2">PN</th><th colspan="2">Pipe</th><th rowspan="2">Status</th><th colspan="2">Level</th></tr><tr><th>US/MH Name</th><th>Flow (l/s)</th><th>Exceeded</th><th></th></tr></thead><tbody><tr><td>11.001</td><td>27</td><td>2.9</td><td>OK</td><td></td><td></td></tr></tbody></table> |            |                                                    |        |                                                                                     |  | PN | Pipe |  | Status | Level |  | US/MH Name | Flow (l/s) | Exceeded |  | 11.001 | 27 | 2.9 | OK |  |  |
| PN                                                                                                                                                                                                                                                                                                               | Pipe       |                                                    | Status | Level                                                                               |  |    |      |  |        |       |  |            |            |          |  |        |    |     |    |  |  |
|                                                                                                                                                                                                                                                                                                                  | US/MH Name | Flow (l/s)                                         |        | Exceeded                                                                            |  |    |      |  |        |       |  |            |            |          |  |        |    |     |    |  |  |
| 11.001                                                                                                                                                                                                                                                                                                           | 27         | 2.9                                                | OK     |                                                                                     |  |    |      |  |        |       |  |            |            |          |  |        |    |     |    |  |  |
| ©1982-2020 Innovyze                                                                                                                                                                                                                                                                                              |            |                                                    |        |                                                                                     |  |    |      |  |        |       |  |            |            |          |  |        |    |     |    |  |  |

1 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for 1.000

| PN     | US/MH |       | Return<br>Period | Climate<br>Change | First (X)<br>Surcharge | First (Y)<br>Flood | First (Z)<br>Overflow | Overflow<br>Act. | Water        | Surcharged   | Flooded        | Half Drain              |                            |
|--------|-------|-------|------------------|-------------------|------------------------|--------------------|-----------------------|------------------|--------------|--------------|----------------|-------------------------|----------------------------|
|        | Name  | Storm |                  |                   |                        |                    |                       |                  | Level<br>(m) | Depth<br>(m) | Volume<br>(m³) | Flow /<br>Cap.<br>(l/s) | Overflow<br>Time<br>(mins) |
| 11.002 | 28    | 1440  | Winter           | 1                 | +0%                    | 30/120             | Winter                |                  | 66.483       | -0.160       | 0.000          | 0.02                    |                            |
| 11.003 | 29    | 1440  | Winter           | 1                 | +0%                    | 1/360              | Winter                |                  | 66.482       | 0.091        | 0.000          | 0.04                    | 1122                       |
| 12.000 | 30    | 30    | Winter           | 1                 | +0%                    | 100/15             | Summer                |                  | 67.654       | -0.331       | 0.000          | 0.29                    |                            |
| 12.001 | 31    | 30    | Winter           | 1                 | +0%                    |                    |                       |                  | 67.405       | -0.419       | 0.000          | 0.09                    |                            |
| 11.004 | 32    | 1440  | Winter           | 1                 | +0%                    | 1/15               | Summer                |                  | 66.520       | 0.370        | 0.000          | 0.02                    |                            |
| 1.005  | 33    | 120   | Winter           | 1                 | +0%                    | 1/15               | Summer                |                  | 66.405       | 0.232        | 0.000          | 0.04                    |                            |
| 1.006  | 34    | 120   | Summer           | 1                 | +0%                    | 1/15               | Summer                |                  | 66.380       | 0.795        | 0.000          | 0.34                    |                            |

| PN     | US/MH | Pipe<br>Flow | Status     | Level    |
|--------|-------|--------------|------------|----------|
|        | Name  | (l/s)        |            | Exceeded |
| 11.002 | 28    | 3.0          | OK         |          |
| 11.003 | 29    | 8.2          | SURCHARGED |          |
| 12.000 | 30    | 56.6         | OK         |          |
| 12.001 | 31    | 56.6         | OK         |          |
| 11.004 | 32    | 5.5          | SURCHARGED |          |
| 1.005  | 33    | 22.8         | SURCHARGED |          |
| 1.006  | 34    | 22.9         | SURCHARGED |          |

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| Ridge and Partners LLP                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |                                                    | Page 23                                                                             |
| The Cowyards<br>Blenheim Park, Oxford Road<br>Woodstock OX20 1QR                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | Atlas Park<br>Proposed SW<br>Drainage Calculations |  |
| Date 14/06/2023<br>File Proposed SW Network GFRO.MDX                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | Designed by LMc<br>Checked by PB                   |                                                                                     |
| Innovyze                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | Network 2020.1                                     |                                                                                     |
| <p><u>30 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for 1.000</u></p> <p><u>Simulation Criteria</u></p> <p>Areal Reduction Factor 1.000    Manhole Headloss Coeff (Global) 0.000    MADD Factor * 10m³/ha Storage 0.000<br/>Hot Start (mins) 0    Foul Sewage per hectare (l/s) 0.000    Inlet Coeffiecient 0.500<br/>Hot Start Level (mm) 0    Additional Flow - % of Total Flow 0.000    Flow per Person per Day (l/per/day) 0.000</p> <p>Number of Input Hydrographs 0    Number of Offline Controls 0    Number of Time/Area Diagrams 0<br/>Number of Online Controls 6    Number of Storage Structures 6    Number of Real Time Controls 0</p> <p><u>Synthetic Rainfall Details</u></p> <p>Rainfall Model    FSR M5-60 (mm) 18.000    Cv (Summer) 0.750<br/>Region England and Wales    Ratio R 0.389    Cv (Winter) 0.840</p> <p>Margin for Flood Risk Warning (mm)    300.0    DVD Status ON<br/>Analysis Timestep 2.5 Second Increment (Extended)    Inertia Status ON<br/>DTS Status    OFF</p> <p>Profile(s)    Summer and Winter<br/>Duration(s) (mins) 15, 30, 60, 120, 240, 360, 480, 960, 1440<br/>Return Period(s) (years)    1, 30, 100<br/>Climate Change (%)    0, 40, 45</p> <p>WARNING: Half Drain Time has not been calculated as the structure is too full.</p> |                                                    |                                                                                     |
| ©1982-2020 Innovyze                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |                                                    |                                                                                     |



| Ridge and Partners LLP                                                                |               |        |                  |                   |                        |                                                    |                       |                  |                       |                            | Page 25                   |                                                                                     |                              |  |
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| The Cowyards<br>Blenheim Park, Oxford Road<br>Woodstock OX20 1QR                      |               |        |                  |                   |                        | Atlas Park<br>Proposed SW<br>Drainage Calculations |                       |                  |                       |                            |                           |  |                              |  |
| Date 14/06/2023<br>File Proposed SW Network GFRO.MDX                                  |               |        |                  |                   |                        | Designed by LMc<br>Checked by PB                   |                       |                  |                       |                            |                           |                                                                                     |                              |  |
| Innovyze                                                                              |               |        |                  |                   |                        | Network 2020.1                                     |                       |                  |                       |                            |                           |                                                                                     |                              |  |
| 30 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for 1.000 |               |        |                  |                   |                        |                                                    |                       |                  |                       |                            |                           |                                                                                     |                              |  |
| PN                                                                                    | US/MH<br>Name | Storm  | Return<br>Period | Climate<br>Change | First (X)<br>Surcharge | First (Y)<br>Flood                                 | First (Z)<br>Overflow | Overflow<br>Act. | Water<br>Level<br>(m) | Surcharged<br>Depth<br>(m) | Flooded<br>Volume<br>(m³) | Flow /<br>Overflow<br>Cap.<br>(l/s)                                                 | Half Drain<br>Time<br>(mins) |  |
| 1.000                                                                                 | 1 240         | Winter | 30               | +40%              | 30/60 Summer           |                                                    |                       |                  | 67.626                | 0.400                      | 0.000                     | 0.18                                                                                |                              |  |
| 1.001                                                                                 | 2 240         | Winter | 30               | +40%              | 30/60 Summer           |                                                    |                       |                  | 67.448                | 0.327                      | 0.000                     | 0.17                                                                                |                              |  |
| 1.002                                                                                 | 3 360         | Winter | 30               | +40%              | 30/60 Summer           |                                                    |                       |                  | 67.365                | 0.295                      | 0.000                     | 0.20                                                                                |                              |  |
| 1.003                                                                                 | 4 960         | Winter | 30               | +40%              | 30/60 Summer           |                                                    |                       |                  | 67.326                | 0.436                      | 0.000                     | 0.04                                                                                |                              |  |
| 2.000                                                                                 | 5 30          | Winter | 30               | +40%              | 100/15 Summer          |                                                    |                       |                  | 67.813                | -0.061                     | 0.000                     | 0.99                                                                                |                              |  |
| 2.001                                                                                 | 6 960         | Winter | 30               | +40%              | 30/480 Winter          |                                                    |                       |                  | 67.799                | 0.033                      | 0.000                     | 0.08                                                                                |                              |  |
| 3.000                                                                                 | 7 960         | Winter | 30               | +40%              | 100/60 Winter          |                                                    |                       |                  | 67.798                | -0.053                     | 0.000                     | 0.03                                                                                |                              |  |
| 2.002                                                                                 | 8 960         | Winter | 30               | +40%              | 30/60 Winter           |                                                    |                       |                  | 67.798                | 0.302                      | 0.000                     | 0.05                                                                                |                              |  |
| 4.000                                                                                 | 9 30          | Winter | 30               | +40%              |                        |                                                    |                       |                  | 68.485                | -0.231                     | 0.000                     | 0.31                                                                                |                              |  |
| 2.003                                                                                 | 10 960        | Winter | 30               | +40%              | 1/15 Winter            |                                                    |                       |                  | 67.822                | 0.687                      | 0.000                     | 0.12                                                                                |                              |  |
| 5.000                                                                                 | 11 240        | Winter | 30               | +40%              |                        |                                                    |                       |                  | 67.148                | -0.467                     | 0.000                     | 0.01                                                                                |                              |  |
| 2.004                                                                                 | 12 240        | Winter | 30               | +40%              | 100/60 Winter          |                                                    |                       |                  | 67.147                | -0.138                     | 0.000                     | 0.02                                                                                |                              |  |
| 6.000                                                                                 | 13 30         | Winter | 30               | +40%              |                        |                                                    |                       |                  | 68.019                | -0.226                     | 0.000                     | 0.50                                                                                |                              |  |
| 6.001                                                                                 | 14 15         | Winter | 30               | +40%              | 100/360 Winter         |                                                    |                       |                  | 67.600                | -0.250                     | 0.000                     | 0.40                                                                                |                              |  |
| 7.000                                                                                 | 15 480        | Winter | 30               | +40%              | 30/30 Winter           |                                                    |                       |                  | 67.499                | 0.217                      | 0.000                     | 0.06                                                                                |                              |  |
| 6.002                                                                                 | 16 480        | Winter | 30               | +40%              | 1/15 Summer            |                                                    |                       |                  | 67.499                | 0.787                      | 0.000                     | 0.35                                                                                |                              |  |
| 8.000                                                                                 | 17 15         | Winter | 30               | +40%              | 30/15 Summer           |                                                    |                       |                  | 68.153                | 0.099                      | 0.000                     | 1.03                                                                                |                              |  |
| 8.001                                                                                 | 18 15         | Winter | 30               | +40%              | 30/15 Summer           |                                                    |                       |                  | 67.978                | 0.024                      | 0.000                     | 0.52                                                                                |                              |  |
| 9.000                                                                                 | 19 360        | Winter | 30               | +40%              | 30/15 Winter           |                                                    |                       |                  | 67.805                | 0.430                      | 0.000                     | 0.04                                                                                |                              |  |
| 8.002                                                                                 | 20 360        | Winter | 30               | +40%              | 1/15 Summer            |                                                    |                       |                  | 67.806                | 0.811                      | 0.000                     | 0.31                                                                                |                              |  |
| 10.000                                                                                | 21 120        | Winter | 30               | +40%              | 30/60 Winter           |                                                    |                       |                  | 67.308                | 0.068                      | 0.000                     | 0.12                                                                                |                              |  |
| 8.003                                                                                 | 22 120        | Winter | 30               | +40%              | 30/30 Winter           |                                                    |                       |                  | 67.295                | 0.209                      | 0.000                     | 0.17                                                                                |                              |  |
| 6.003                                                                                 | 23 120        | Winter | 30               | +40%              | 30/30 Summer           |                                                    |                       |                  | 67.228                | 0.307                      | 0.000                     | 0.23                                                                                |                              |  |
| 2.005                                                                                 | 24 240        | Winter | 30               | +40%              | 30/30 Winter           |                                                    |                       |                  | 67.132                | 0.274                      | 0.000                     | 0.04                                                                                |                              |  |
| 1.004                                                                                 | 25 120        | Winter | 30               | +40%              | 30/30 Winter           |                                                    |                       |                  | 67.003                | 0.226                      | 0.000                     | 0.03                                                                                |                              |  |
| ©1982-2020 Innovyze                                                                   |               |        |                  |                   |                        |                                                    |                       |                  |                       |                            |                           |                                                                                     |                              |  |



|                                                                                              |              |                                                    |               |                                                                                     |  |
|----------------------------------------------------------------------------------------------|--------------|----------------------------------------------------|---------------|-------------------------------------------------------------------------------------|--|
| Ridge and Partners LLP                                                                       |              |                                                    |               | Page 27                                                                             |  |
| The Cowyards<br>Blenheim Park, Oxford Road<br>Woodstock OX20 1QR                             |              | Atlas Park<br>Proposed SW<br>Drainage Calculations |               |  |  |
| Date 14/06/2023<br>File Proposed SW Network GFRO.MDX                                         |              | Designed by LMc<br>Checked by PB                   |               |                                                                                     |  |
| Innovyze                                                                                     |              | Network 2020.1                                     |               |                                                                                     |  |
| <u>30 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for 1.000</u> |              |                                                    |               |                                                                                     |  |
|                                                                                              |              | <b>Pipe</b>                                        |               |                                                                                     |  |
|                                                                                              | <b>US/MH</b> | <b>Flow</b>                                        |               | <b>Level</b>                                                                        |  |
| <b>PN</b>                                                                                    | <b>Name</b>  | <b>(l/s)</b>                                       | <b>Status</b> | <b>Exceeded</b>                                                                     |  |
| 1.004                                                                                        | 25           | 36.7                                               | SURCHARGED    |                                                                                     |  |
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### 30 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for 1.000

|        |         |        |        |         |           |           |           |          | Water  | Surcharged | Flooded | Half Drain |          |        |
|--------|---------|--------|--------|---------|-----------|-----------|-----------|----------|--------|------------|---------|------------|----------|--------|
|        | US/MH   |        | Return | Climate | First (X) | First (Y) | First (Z) | Overflow | Level  | Depth      | Volume  | Flow /     | Overflow | Time   |
| PN     | Name    | Storm  | Period | Change  | Surcharge | Flood     | Overflow  | Act.     | (m)    | (m)        | (m³)    | Cap.       | (l/s)    | (mins) |
| 11.000 | 26 1440 | Winter | 30     | +40%    | 100/480   | Winter    |           |          | 67.015 | -0.185     | 0.000   | 0.00       |          |        |
| 11.001 | 27 1440 | Winter | 30     | +40%    | 30/240    | Winter    |           |          | 67.015 | 0.238      | 0.000   | 0.02       |          | 1422   |
| 11.002 | 28 1440 | Winter | 30     | +40%    | 30/120    | Winter    |           |          | 67.016 | 0.373      | 0.000   | 0.02       |          |        |
| 11.003 | 29 1440 | Winter | 30     | +40%    | 1/360     | Winter    |           |          | 67.014 | 0.623      | 0.000   | 0.04       |          |        |
| 12.000 | 30 30   | Winter | 30     | +40%    | 100/15    | Summer    |           |          | 67.985 | 0.000      | 0.000   | 1.00       |          |        |
| 12.001 | 31 30   | Winter | 30     | +40%    |           |           |           |          | 67.499 | -0.325     | 0.000   | 0.31       |          |        |
| 11.004 | 32 1440 | Winter | 30     | +40%    | 1/15      | Summer    |           |          | 67.052 | 0.902      | 0.000   | 0.02       |          |        |
| 1.005  | 33 480  | Winter | 30     | +40%    | 1/15      | Summer    |           |          | 66.765 | 0.592      | 0.000   | 0.06       |          |        |
| 1.006  | 34 480  | Winter | 30     | +40%    | 1/15      | Summer    |           |          | 66.532 | 0.947      | 0.000   | 0.51       |          |        |

| PN     | US/MH | Pipe<br>Flow | Status     | Level    |
|--------|-------|--------------|------------|----------|
|        | Name  | (1/s)        |            | Exceeded |
| 11.000 | 26    | 0.0          | OK         |          |
| 11.001 | 27    | 3.1          | SURCHARGED |          |
| 11.002 | 28    | 3.8          | SURCHARGED |          |
| 11.003 | 29    | 8.4          | SURCHARGED |          |
| 12.000 | 30    | 192.5        | OK         |          |
| 12.001 | 31    | 192.5        | OK         |          |
| 11.004 | 32    | 5.5          | SURCHARGED |          |
| 1.005  | 33    | 34.4         | SURCHARGED |          |
| 1.006  | 34    | 34.3         | SURCHARGED |          |

|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |                                                    |                                                                                     |                              |                                       |                                     |                    |                                     |                          |                        |                                         |                                           |                |                       |                   |                          |               |                   |            |                   |                                                              |  |                          |            |                    |           |
|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------|-------------------------------------------------------------------------------------|------------------------------|---------------------------------------|-------------------------------------|--------------------|-------------------------------------|--------------------------|------------------------|-----------------------------------------|-------------------------------------------|----------------|-----------------------|-------------------|--------------------------|---------------|-------------------|------------|-------------------|--------------------------------------------------------------|--|--------------------------|------------|--------------------|-----------|
| Ridge and Partners LLP                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |                                                    | Page 29                                                                             |                              |                                       |                                     |                    |                                     |                          |                        |                                         |                                           |                |                       |                   |                          |               |                   |            |                   |                                                              |  |                          |            |                    |           |
| The Cowyards<br>Blenheim Park, Oxford Road<br>Woodstock OX20 1QR                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | Atlas Park<br>Proposed SW<br>Drainage Calculations |  |                              |                                       |                                     |                    |                                     |                          |                        |                                         |                                           |                |                       |                   |                          |               |                   |            |                   |                                                              |  |                          |            |                    |           |
| Date 14/06/2023<br>File Proposed SW Network GFRO.MDX                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | Designed by LMc<br>Checked by PB                   |                                                                                     |                              |                                       |                                     |                    |                                     |                          |                        |                                         |                                           |                |                       |                   |                          |               |                   |            |                   |                                                              |  |                          |            |                    |           |
| Innovyze                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | Network 2020.1                                     |                                                                                     |                              |                                       |                                     |                    |                                     |                          |                        |                                         |                                           |                |                       |                   |                          |               |                   |            |                   |                                                              |  |                          |            |                    |           |
| <p><u>100 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for 1.000</u></p> <p><u>Simulation Criteria</u></p> <table><tr><td>Areal Reduction Factor 1.000</td><td>Manhole Headloss Coeff (Global) 0.000</td><td>MADD Factor * 10m³/ha Storage 0.000</td></tr><tr><td>Hot Start (mins) 0</td><td>Foul Sewage per hectare (l/s) 0.000</td><td>Inlet Coeffiecient 0.500</td></tr><tr><td>Hot Start Level (mm) 0</td><td>Additional Flow - % of Total Flow 0.000</td><td>Flow per Person per Day (l/per/day) 0.000</td></tr></table> <p>Number of Input Hydrographs 0    Number of Offline Controls 0    Number of Time/Area Diagrams 0<br/>Number of Online Controls 6    Number of Storage Structures 6    Number of Real Time Controls 0</p> <p><u>Synthetic Rainfall Details</u></p> <table><tr><td>Rainfall Model</td><td>FSR M5-60 (mm) 18.000</td><td>Cv (Summer) 0.750</td></tr><tr><td>Region England and Wales</td><td>Ratio R 0.389</td><td>Cv (Winter) 0.840</td></tr></table> <p>Margin for Flood Risk Warning (mm) 300.0    DVD Status ON<br/>Analysis Timestep 2.5 Second Increment (Extended)    Inertia Status ON<br/>DTS Status OFF</p> <table><tr><td>Profile(s)</td><td>Summer and Winter</td></tr><tr><td>Duration(s) (mins) 15, 30, 60, 120, 240, 360, 480, 960, 1440</td><td></td></tr><tr><td>Return Period(s) (years)</td><td>1, 30, 100</td></tr><tr><td>Climate Change (%)</td><td>0, 40, 45</td></tr></table> <p>WARNING: Half Drain Time has not been calculated as the structure is too full.</p> |                                                    |                                                                                     | Areal Reduction Factor 1.000 | Manhole Headloss Coeff (Global) 0.000 | MADD Factor * 10m³/ha Storage 0.000 | Hot Start (mins) 0 | Foul Sewage per hectare (l/s) 0.000 | Inlet Coeffiecient 0.500 | Hot Start Level (mm) 0 | Additional Flow - % of Total Flow 0.000 | Flow per Person per Day (l/per/day) 0.000 | Rainfall Model | FSR M5-60 (mm) 18.000 | Cv (Summer) 0.750 | Region England and Wales | Ratio R 0.389 | Cv (Winter) 0.840 | Profile(s) | Summer and Winter | Duration(s) (mins) 15, 30, 60, 120, 240, 360, 480, 960, 1440 |  | Return Period(s) (years) | 1, 30, 100 | Climate Change (%) | 0, 40, 45 |
| Areal Reduction Factor 1.000                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | Manhole Headloss Coeff (Global) 0.000              | MADD Factor * 10m³/ha Storage 0.000                                                 |                              |                                       |                                     |                    |                                     |                          |                        |                                         |                                           |                |                       |                   |                          |               |                   |            |                   |                                                              |  |                          |            |                    |           |
| Hot Start (mins) 0                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | Foul Sewage per hectare (l/s) 0.000                | Inlet Coeffiecient 0.500                                                            |                              |                                       |                                     |                    |                                     |                          |                        |                                         |                                           |                |                       |                   |                          |               |                   |            |                   |                                                              |  |                          |            |                    |           |
| Hot Start Level (mm) 0                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | Additional Flow - % of Total Flow 0.000            | Flow per Person per Day (l/per/day) 0.000                                           |                              |                                       |                                     |                    |                                     |                          |                        |                                         |                                           |                |                       |                   |                          |               |                   |            |                   |                                                              |  |                          |            |                    |           |
| Rainfall Model                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | FSR M5-60 (mm) 18.000                              | Cv (Summer) 0.750                                                                   |                              |                                       |                                     |                    |                                     |                          |                        |                                         |                                           |                |                       |                   |                          |               |                   |            |                   |                                                              |  |                          |            |                    |           |
| Region England and Wales                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | Ratio R 0.389                                      | Cv (Winter) 0.840                                                                   |                              |                                       |                                     |                    |                                     |                          |                        |                                         |                                           |                |                       |                   |                          |               |                   |            |                   |                                                              |  |                          |            |                    |           |
| Profile(s)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | Summer and Winter                                  |                                                                                     |                              |                                       |                                     |                    |                                     |                          |                        |                                         |                                           |                |                       |                   |                          |               |                   |            |                   |                                                              |  |                          |            |                    |           |
| Duration(s) (mins) 15, 30, 60, 120, 240, 360, 480, 960, 1440                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |                                                    |                                                                                     |                              |                                       |                                     |                    |                                     |                          |                        |                                         |                                           |                |                       |                   |                          |               |                   |            |                   |                                                              |  |                          |            |                    |           |
| Return Period(s) (years)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | 1, 30, 100                                         |                                                                                     |                              |                                       |                                     |                    |                                     |                          |                        |                                         |                                           |                |                       |                   |                          |               |                   |            |                   |                                                              |  |                          |            |                    |           |
| Climate Change (%)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | 0, 40, 45                                          |                                                                                     |                              |                                       |                                     |                    |                                     |                          |                        |                                         |                                           |                |                       |                   |                          |               |                   |            |                   |                                                              |  |                          |            |                    |           |
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100 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for 1.000

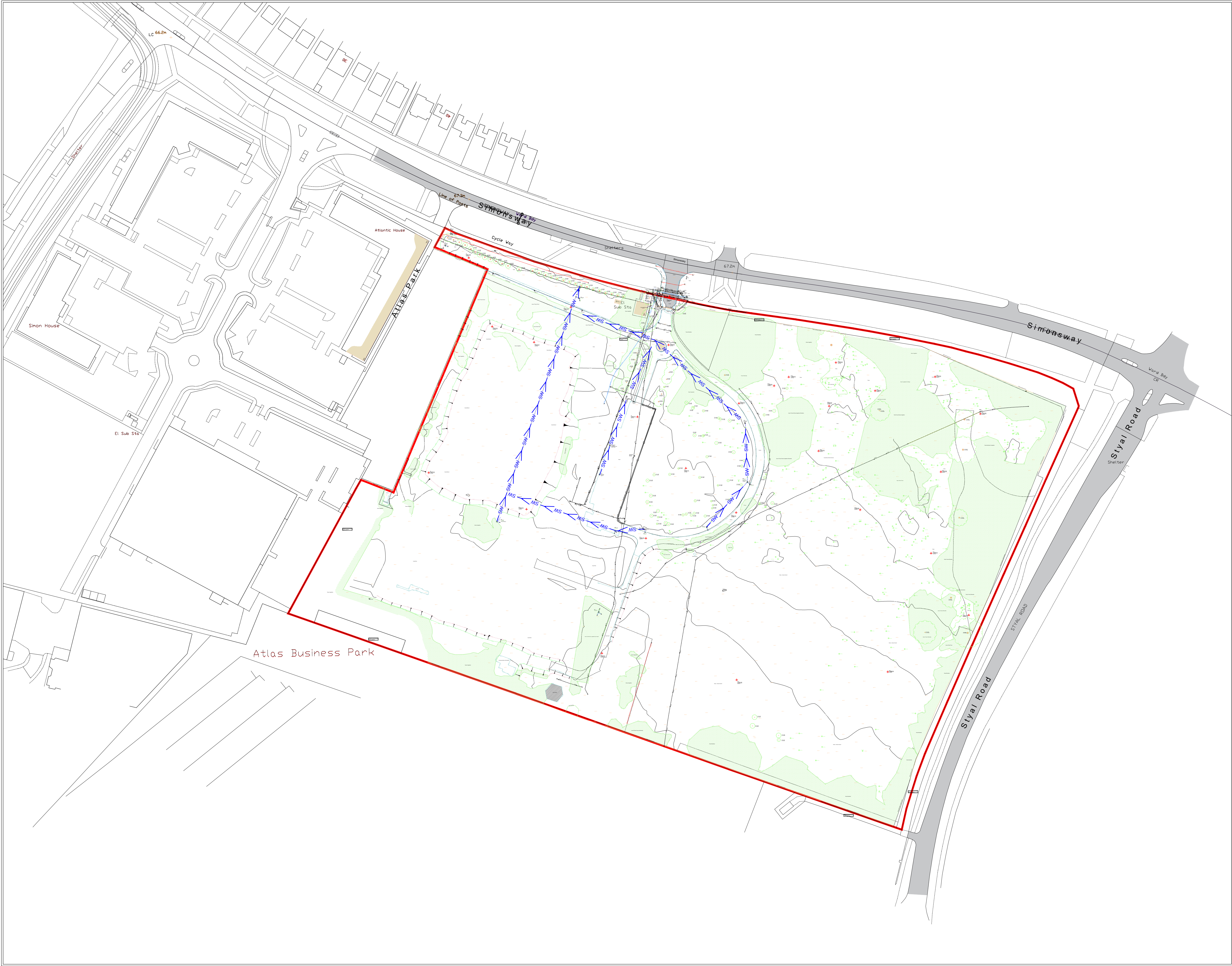
|        |       |       |        |        |         |           |           |           |          | Water  | Surcharged | Flooded | Half Drain |          |        |
|--------|-------|-------|--------|--------|---------|-----------|-----------|-----------|----------|--------|------------|---------|------------|----------|--------|
|        | US/MH |       |        | Return | Climate | First (X) | First (Y) | First (Z) | Overflow | Level  | Depth      | Volume  | Flow /     | Overflow | Time   |
| PN     | Name  | Storm | Period | Change |         | Surcharge | Flood     | Overflow  | Act.     | (m)    | (m)        | (m³)    | Cap.       | (1/s)    | (mins) |
| 1.000  | 1     | 240   | Winter | 100    | +45%    | 30/60     | Summer    |           |          | 67.953 | 0.727      | 0.000   | 0.24       |          |        |
| 1.001  | 2     | 360   | Winter | 100    | +45%    | 30/60     | Summer    |           |          | 67.783 | 0.662      | 0.000   | 0.18       |          |        |
| 1.002  | 3     | 960   | Winter | 100    | +45%    | 30/60     | Summer    |           |          | 67.725 | 0.655      | 0.000   | 0.14       |          |        |
| 1.003  | 4     | 960   | Winter | 100    | +45%    | 30/60     | Summer    |           |          | 67.725 | 0.835      | 0.000   | 0.04       |          |        |
| 2.000  | 5     | 960   | Winter | 100    | +45%    | 100/15    | Summer    |           |          | 68.163 | 0.289      | 0.000   | 0.17       |          |        |
| 2.001  | 6     | 960   | Winter | 100    | +45%    | 30/480    | Winter    |           |          | 68.162 | 0.396      | 0.000   | 0.11       |          |        |
| 3.000  | 7     | 960   | Winter | 100    | +45%    | 100/60    | Winter    |           |          | 68.160 | 0.309      | 0.000   | 0.04       |          |        |
| 2.002  | 8     | 960   | Winter | 100    | +45%    | 30/60     | Winter    |           |          | 68.160 | 0.664      | 0.000   | 0.05       |          |        |
| 4.000  | 9     | 30    | Winter | 100    | +45%    |           |           |           |          | 68.511 | -0.205     | 0.000   | 0.42       |          |        |
| 2.003  | 10    | 960   | Winter | 100    | +45%    | 1/15      | Winter    |           |          | 68.184 | 1.049      | 0.000   | 0.12       |          |        |
| 5.000  | 11    | 240   | Winter | 100    | +45%    |           |           |           |          | 67.615 | 0.000      | 0.000   | 0.01       |          |        |
| 2.004  | 12    | 120   | Winter | 100    | +45%    | 100/60    | Winter    |           |          | 67.611 | 0.326      | 0.000   | 0.03       |          |        |
| 6.000  | 13    | 30    | Winter | 100    | +45%    |           |           |           |          | 68.065 | -0.180     | 0.000   | 0.67       |          |        |
| 6.001  | 14    | 480   | Winter | 100    | +45%    | 100/360   | Winter    |           |          | 67.868 | 0.018      | 0.000   | 0.12       |          |        |
| 7.000  | 15    | 480   | Winter | 100    | +45%    | 30/30     | Winter    |           |          | 67.866 | 0.584      | 0.000   | 0.08       |          |        |
| 6.002  | 16    | 480   | Winter | 100    | +45%    | 1/15      | Summer    |           |          | 67.866 | 1.154      | 0.000   | 0.35       |          |        |
| 8.000  | 17    | 15    | Winter | 100    | +45%    | 30/15     | Summer    |           |          | 68.725 | 0.671      | 0.000   | 1.41       |          |        |
| 8.001  | 18    | 15    | Winter | 100    | +45%    | 30/15     | Summer    |           |          | 68.572 | 0.618      | 0.000   | 0.69       |          |        |
| 9.000  | 19    | 480   | Winter | 100    | +45%    | 30/15     | Winter    |           |          | 68.185 | 0.810      | 0.000   | 0.04       |          |        |
| 8.002  | 20    | 480   | Winter | 100    | +45%    | 1/15      | Summer    |           |          | 68.188 | 1.193      | 0.000   | 0.31       |          |        |
| 10.000 | 21    | 120   | Winter | 100    | +45%    | 30/60     | Winter    |           |          | 67.810 | 0.570      | 0.000   | 0.16       |          |        |
| 8.003  | 22    | 120   | Winter | 100    | +45%    | 30/30     | Winter    |           |          | 67.796 | 0.710      | 0.000   | 0.22       |          |        |
| 6.003  | 23    | 120   | Winter | 100    | +45%    | 30/30     | Summer    |           |          | 67.734 | 0.813      | 0.000   | 0.31       |          |        |
| 2.005  | 24    | 120   | Winter | 100    | +45%    | 30/30     | Winter    |           |          | 67.610 | 0.752      | 0.000   | 0.06       |          |        |
| 1.004  | 25    | 120   | Winter | 100    | +45%    | 30/30     | Winter    |           |          | 67.381 | 0.604      | 0.000   | 0.04       |          |        |



| Ridge and Partners LLP                                                                                                                                                                                                                                                                                                           |               |                                                    |               | Page 33                                                                             |          |    |               |      |               |        |       |  |          |       |    |      |  |            |  |
|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------|----------------------------------------------------|---------------|-------------------------------------------------------------------------------------|----------|----|---------------|------|---------------|--------|-------|--|----------|-------|----|------|--|------------|--|
| The Cowyards<br>Blenheim Park, Oxford Road<br>Woodstock OX20 1QR                                                                                                                                                                                                                                                                 |               | Atlas Park<br>Proposed SW<br>Drainage Calculations |               |  |          |    |               |      |               |        |       |  |          |       |    |      |  |            |  |
| Date 14/06/2023<br>File Proposed SW Network GFRO.MDX                                                                                                                                                                                                                                                                             |               | Designed by LMc<br>Checked by PB                   |               |                                                                                     |          |    |               |      |               |        |       |  |          |       |    |      |  |            |  |
| Innovyze                                                                                                                                                                                                                                                                                                                         |               | Network 2020.1                                     |               |                                                                                     |          |    |               |      |               |        |       |  |          |       |    |      |  |            |  |
| <u>100 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for 1.000</u>                                                                                                                                                                                                                                    |               |                                                    |               |                                                                                     |          |    |               |      |               |        |       |  |          |       |    |      |  |            |  |
| <table><thead><tr><th rowspan="2">PN</th><th rowspan="2">US/MH<br/>Name</th><th>Pipe</th><th rowspan="2">Flow<br/>(l/s)</th><th rowspan="2">Status</th><th>Level</th></tr><tr><th></th><th>Exceeded</th></tr></thead><tbody><tr><td>1.004</td><td>25</td><td>42.0</td><td></td><td>SURCHARGED</td><td></td></tr></tbody></table> |               |                                                    |               |                                                                                     |          | PN | US/MH<br>Name | Pipe | Flow<br>(l/s) | Status | Level |  | Exceeded | 1.004 | 25 | 42.0 |  | SURCHARGED |  |
| PN                                                                                                                                                                                                                                                                                                                               | US/MH<br>Name | Pipe                                               | Flow<br>(l/s) | Status                                                                              | Level    |    |               |      |               |        |       |  |          |       |    |      |  |            |  |
|                                                                                                                                                                                                                                                                                                                                  |               |                                                    |               |                                                                                     | Exceeded |    |               |      |               |        |       |  |          |       |    |      |  |            |  |
| 1.004                                                                                                                                                                                                                                                                                                                            | 25            | 42.0                                               |               | SURCHARGED                                                                          |          |    |               |      |               |        |       |  |          |       |    |      |  |            |  |
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## **APPENDIX C – GPR SURVEY**



Disclaimer:  
Subject to survey.

Notes:

**KEY**

— Approx Site Boundary  
(93,044m<sup>2</sup> / 22.99 acres / 9.3 ha )

|   |             |            |    |    |
|---|-------------|------------|----|----|
| A | First Issue | 01.08.2022 | PL | HA |
| - | First Issue | 01.08.2022 | PL | HA |

N

0

10

20

30

40

50

Client:

**hale**  
ARCHITECTURE | DESIGN MANAGEMENT  
22c Leathermarket Street, London, SE1 3HP

Project:  
**Atlas Business Park  
Manchester**

Drawing Title:  
**Existing Site Plan**

Project No:  
20071

Scale @ A1  
1:1000

Drawing No:  
**SK 115**

Revision:  
**A**