

Mayfield Phase 1a – The Republic

Drainage Statement

JANUARY 2025

PREPARED FOR

Deloitte / WSP



Drainage Statement

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Report Reference	0197_MAY-CIV-SWI-XX-RP-C-300001
Issued	15/01/2024
Revised	-

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1. Introduction

Civic Engineers are the appointed drainage consultant for portions of the Mayfield Phase 1a development, which comprises three buildings: Baring St. Office No. 1 (Plot O/Poulton), Baring St. Office No. 2 (Plot M/Republic) and Baring St. MSCP (Plot N); alongside associated public realm.

Lendlease are currently appointed under a Pre-Construction Services Agreement as the Main Contractor for the Republic and portions of the external public realm. The appointment of a separate Contractor responsible for works relating to the Poulton, MSCP and the remaining public realm is currently pending.

This drainage statement has been prepared for discharge of pre-commencement drainage conditions pertaining to the planning permission secured for the Republic (planning application reference 137349/JO/2023) and for evidencing Pol 03 criteria within the BREEAM assessment of the Republic. It summarises the proposed drainage design of Phase 1a in the context of the wider Mayfield development and relevant planning documentation previously submitted to Manchester City Council.

This statement is based on currently available information held by Civic Engineers. Proposals contained or forming part of this statement represent the design intent and may be subject to alteration or adjustment in finalising the detailed design and construction for this project.

2. Development Details

2.1. Proposed Development Details

Phase 1a comprises approximately 0.976 ha of the wider 7 ha Mayfield Phase 1 development and is encompassed by the Republic and the red-hatched and green-hatched areas shown in Figure 1. The Phase 1a development is located at approximate National Grid Reference SJ850975, with nearest post code M12 6HH.

Permanent works associated with the Republic are enclosed within the red boundary, with temporary surfacing and drainage to be installed as part of this package within the red-hatched areas. Future development forming part of the Poulton and MSCP works are denoted by green hatching.



Figure 1. Excerpt of Site Wide Landscape Context Plan (dwg. no. 0198_MAY-SEW-SW1-ZZZZ-DR-L-001100) showing the entirety of Phase 1a.

A proposed site-wide context plan is provided in Appendix A.

The Republic is a 12-storey building with a basement level, containing office space with external terrace access at upper levels and public lobby space and back of house plant at ground floor. The proposed landscaping forming the public realm strategy is to integrate with a sustainable drainage system (SuDS) for the development, in which attenuation and treatment of run-off and improved amenity and biodiversity is to be achieved via SuDS features including bioretention areas (i.e. rain gardens, filter drains and tree planting), pervious paving, and geo-cellular attenuation tanks.

2.2. Planning Context

As part of planning application 137349/JO/2023, a Drainage Strategy (document reference Stage 4 Drainage Strategy, revision P07, hereafter referred to as the 'Phase 1 Drainage Strategy') has been prepared by BuroHappold Engineering and outlines the principles of the proposed drainage network serving the entire Phase 1 development, including Mayfield Park.

A Flood Risk Assessment (FRA) was also produced by BuroHappold Engineering (document reference Site Wide and Phase 1 Flood Risk Assessment, rev. 00) and submitted as part of planning application 124972/FO/20190. The scope of the FRA extends to the wider Mayfield Strategic Regeneration Framework (SRF) area including Phase 1b. Planning application 137349/JO/2023 was accompanied by an FRA Statement of Conformity (also produced by BuroHappold) which advised that the conclusions drawn in the previous FRA are unchanged as a result of the latest development proposals. The FRA should be referred to for further information on the Site's existing flood risk and assessment of BREEAM Pol 03 criteria 2-4.

Civic Engineers are responsible for the design of drainage within Phase 1a, and the design parameters outlined in the Phase 1 Drainage Strategy by BuroHappold (including locations of outfalls, indicative catchments and proposed discharge rates) have formed the basis for the Phase 1a drainage design detailed in this statement. The scope of this statement is therefore restricted to the Phase 1a drainage design and associated hydraulic modelling. For further information on the wider development, including the derivation of agreed discharge rates/volumes, details of agreed outfalls and impacts of the development on flood risk; the Phase 1 Drainage Strategy provided as part of planning application 137349/JO/2023 should be consulted.

3. Proposed Surface Water Drainage

3.1. Design Parameters

Section 3 of the Phase 1 Drainage Strategy lists the following design parameters agreed with Manchester City Council for the Phase 1 drainage network under Discharge of Conditions 10 of planning application 124972/FO/2019 (application for full planning permission for the Poulton, multi-storey car park and Mayfield Park), submitted as part of application CDN/20/0691:

“

- *Proposed discharge rate is to be restricted to 50% of the existing brownfield runoff rate with 2l/s/ha to be subtracted from this peak 50% discharge rate.*
- *Climate change allowance is to be 30%, however, attenuation volumes should also be checked against a 40% allowance.*
- *No flooding of buildings occurs in the 1 in 100-year rainfall event plus climate change allowance. Plot designers will need to accommodate all the necessary surface water attenuation within the plot demise. The attenuation will need to be designed to accommodate the 1 in 100-year storm events plus climate change allowance based on a 50% brownfield rate with a further reduction of 2l/s/ha for long-term storage.*
- *Surface flooding of open spaces is acceptable for short periods in events over 1 in 30-year return rainfall events.*
- *Overland flow routes for extreme events are diverted away from buildings.*
- *As the existing site is brownfield the 1 in 100-year, 6-hour rainfall runoff volume shall be constrained to a maximum of the existing brownfield runoff volume for the same event.*
- *For surface car parks (>50 spaces) and areas of unusual pollution risk pollution control measures will be provided (likely to be a combination of petrol interceptors and SuDS features where applicable).*

”

These parameters have informed the Phase 1a drainage design presented in this Drainage Statement.

Within Table 7-1 of the Phase 1 Drainage Strategy, the existing peak brownfield discharge rates of proposed catchments are shown, with proposed rates for these catchments derived using the 50% brownfield minus 2l/s/ha formula specified above. Outfall 3, which collects the catchments associated with Phase 1a and discharges run-off to the River Medlock, is shown to have a proposed peak discharge rate of 138.68 l/s. This rate is compliant with the requirements presented in BREEAM Pol 03 criteria 6 and 13.

It is noted that this value does not include the proposed catchment to the west of the MSCP, for which a design was not available at the time of writing of the Phase 1 Drainage Strategy. This catchment is, however, proposed to drain to a separate outfall, as described in Section 3.2.2.

The climate change allowances stated in the above design parameters represent the best practice planning guidance in place at the time of agreement and therefore satisfy the requirements of BREEAM Pol 03 criteria 8 and 15.

3.2. Proposed Network Description

The proposed surface water drainage network to be installed as part of works to the Republic is presented in drawing 0197_MAY-CIV-SWI-ZZZZ-DR-C-300001, provided in Appendix B. The system comprises bioretention features, pervious paving and filter drains which ultimately drain to a geo-cellular attenuation tank. The network discharges into the River Medlock via an existing installed outfall at a restricted rate, which is achieved through the implementation of various proposed orifice and vortex flow controls throughout the network.

Due to the phased nature of the development, some elements of the design are to be installed in a temporary condition and will be completed at a later date as part of works to the Poulton and the MSCP. This includes rain gardens RG1(1), RG1(2) and RG1(3) adjacent the MSCP, filter drains and permeable paving to the central spine that runs between the Republic and the MSCP.

In the final form of the development, runoff from the MSCP roof is to drain into RG1(1), RG1(2) and RG1(3). The Poulton discharges to a separate geo-cellular attenuation tank which operates on its own vortex flow control and connects into the existing River Medlock outfall. A portion of the site to the west of the MSCP is proposed to discharge to an existing highway drain. The final drainage network is shown in drawing 0196_MAY-CIV-SWI-ZZZZ-DR-C-300001, included for reference in Appendix B.

3.2.1. Discharge Hierarchy

Results of infiltration testing contained within Appendix I of the Phase 1 Drainage Strategy indicated “elevated levels of heavy metals and PAH which could pose a risk to controlled waters” and, in order to facilitate use of infiltration, recommended that made ground is excavated until clean natural strata is encountered before being backfilled with suitable permeable inert strata. Based on borehole results from an intrusive site investigation conducted in November 2023 by Civic Earth (report 51001-CE-01-XX-R-G-1003, rev. P02), provided in Appendix F, the depth of made ground and associated extent of excavation required to provide inert strata is not deemed feasible across the majority of the site.

The proposed Phase 1a drainage design has previously sought to utilise infiltration as a means of surface water disposal for the highway catchment to the west of the MSCP (which cannot be connected to the River Medlock outfall without a pumped solution). However, the 2023 site investigation found a low infiltration rate and multiple exceedances of freshwater Environmental Quality Standards (EQS) and UK Drinking Water Values (DWV) when testing substrata in this area.

Infiltration is therefore deemed infeasible due to the low rate and potential leaching of contaminants into groundwater. In accordance with the hierarchy approach outlined in Section 5 of BS 8533:2011, the majority of surface water runoff is to be discharged to a surface water body (the River Medlock), as agreed in the Phase 1 Drainage Strategy, with runoff from the highway catchment to the west of the MSCP discharged to a surface water (highway) drain.

3.2.2. Proposed Catchments

Six distinct sub-catchments may be delineated within the final strategy:

- Run-off from the Poulton (approx. 0.129 ha impermeable area).
 - Run-off conveyed from rainwater pipes into an existing 2m x 28m x 1.2m (W x L x D) underground geo-cellular attenuation tank (Tank 1) installed during the Mayfield Park works. The tank additionally attenuates overflow from a rain garden to the northwest, which was also installed as part of these works. An existing vortex control restricts outflow from the attenuation tank to 7.5 l/s (i.e. 50% of the existing brownfield rate for the Poulton, minus 2 l/s/ha).
- Run-off from the MSCP (approx. 0.174 ha impermeable area).
 - Run-off conveyed from rainwater pipes directly into the sub-base of adjacent rain gardens via rainwater diffuser units. Rain gardens discharge into a proposed 4m x 10m x 1.2m (W x L x D) geo-cellular attenuation tank (Tank 2).
- Run-off from the Republic (approx. 0.232 ha impermeable area).
 - Run-off conveyed directly to Tank 2, with some portions discharging to the sub-base of adjacent rain gardens via rainwater diffuser units.

- Run-off from the access road to the south of the development, i.e., the former slip road onto the Mancunian Way (approx. 0.087 ha impermeable area).
 - Where possible within the current levels design, some gullies draining the slip road discharge into adjacent rain gardens, otherwise, run-off is conveyed to Tank 2.
- Run-off from private landscaping to the west of the MSCP, which is at a lower level to the rest of the site (approx. 0.023 ha impermeable area).
 - Run-off drains to a proposed rain garden with outflow restricted via a proposed orifice flow control. As the site's topography precludes the discharge of this catchment to the existing River Medlock outfall without a pumped solution and intrusive site investigation advises against the use of infiltration as discussed in Section 3.2, it is proposed to discharge into a nearby existing highway drain.
- Run-off from remaining private landscaping (approx. 0.265 ha impermeable area).
 - Run-off drains to proposed pervious paving and rain gardens, with an ultimate outfall into Tank 2.

From Tank 2, run-off is conveyed through a primary vortex flow control which restricts outflow to the existing greenfield run-off rate for the catchments it drains ($Q_{BAR} = 4.3$ l/s, calculation provided on page 4 of Appendix D). In more severe storm events, once the attenuation within the site is full and the primary flow control chamber begins to surcharge above the top level of Tank 2, an overflow is provided which routes run-off into a secondary vortex flow control restricted to 58 l/s (the minimum flow rate achievable within the current design without causing significant on-site flooding).

Pre- and Post-development Runoff Volume

The Phase 1 Drainage Strategy assessed pre- and post-development runoff volumes based on the effective catchment areas (i.e., impermeable area) served by the existing and proposed drainage systems, respectively, showing that due to the reduced effective area in the proposed scheme, the volume of runoff discharged in the 1 in 100 year 6 hour storm will be reduced. The pre-development runoff volume was based on the existing site prior to the demolition of existing development.

Drawing 0196_MAY-CIV-SWI-ZZZZ-DR-C-100003, provided in Appendix C, illustrates the permeable areas in the existing and proposed development for Phase 1a (ref. Figure 1). The permeable area of the site is to be increased from 0.082 ha pre-development to 0.121 ha post-development. As a result, and in line with the methodology utilised in the Phase 1 Drainage Strategy, the volume of runoff discharged in the 1 in 100 year 6 hour storm shall be reduced compared to existing.

Considering the full lifetime of the development and the effects of climate change, increased rainfall intensities occurring within the 1 in 100 year plus 30% climate change 6 hour storm will result in an increased volume of runoff from the proposed development compared to the existing scenario, however, due to limited public open space for long-term storage, this can only be mitigated through the introduction of infiltration which is shown to be infeasible in Section 3.2.1. To provide additional mitigation against increased runoff volume, the proposed surface water drainage system is designed to discharge at greenfield rates (Q_{BAR}) wherever possible, and only discharges at a higher rate for shorter periods within more severe storms. Further information is provided in the discussion of drainage simulation results in Section 3.3.

Based on the above, the proposed development is deemed to satisfy BREEAM Pol 03 criteria 12 and 13.

3.2.3. Proposed SuDS Features

Rain Gardens

Proposed rain gardens consist of 300mm freeboard storage, underlain by 600mm topsoil/subsoil and 300mm 4/20 coarse graded aggregate sub-base. As discussed in Section 3.2.1, disposal of run-off via infiltration within rain gardens is not deemed to be feasible, therefore the base and sides of soils and sub-bases of the proposed rain gardens are wrapped with an impermeable geotextile.

Overflow pipes within rain gardens are proposed to convey flows directly to below ground pipework where the incoming flow rate to the rain garden exceeds the percolation rate of its soils. Where rain gardens are sited on areas of sloping ground (i.e., between Plots N and M) check dams with weir overflows are proposed to maximise storage in these components.

As part of works to the Republic, rain gardens RG1(1), RG1(2) and RG1(3) are to be part-installed, with their final construction completed in a separate phase. The temporary construction of these comprises 300mm of sub-base only, fully wrapped (i.e. base, sides and top) with an impermeable geotextile and overlain with a 100mm sand blinding protection blanket and temporary backfill to form the proposed subgrade of a temporary construction access road.

Filter Drains

Where planting is proposed on steeper slopes on which standard rain garden construction is not feasible, filter drains are proposed at the base of slopes and consist of a 675mm wide 4/20 coarse graded aggregate surround to perforated pipes, with the base and sides of the surround wrapped with an impermeable geotextile. A permeable filtration geotextile is installed at the top of the surround and overlain by 300mm topsoil for ornamental planting.

Within the Republic works, filter drains are to also be installed in a temporary construction, comprising only the 4/20 aggregate fully wrapped (i.e. base, sides and top) in an impermeable geotextile and overlain with a 100mm sand blinding protection blanket and temporary backfill to form the proposed subgrade of a temporary construction access road.

Pervious Paving

Porous resin bound gravel is to be utilised within areas of the site drained via pervious paving and comprises gravel aggregate underlain by 140mm porous asphalt base courses and 300mm Type 3 sub-base. The bottom and sides of the base and sub-base of the paving are to be wrapped with an impermeable geotextile owing to infiltration test results. Where pervious paving is sited on areas of sloping ground (i.e., between Plots N and M) the sub-bases are to be 'compartmentalised' using the impermeable geotextile to maximise storage, with orifice controls restricting outflow from each compartment into the wider network.

Within the Republic works, only the sub-base of proposed pervious paving is to be installed, with base, sides and top wrapped with an impermeable geotextile and overlain with a temporary impermeable surface construction.

Geo-cellular Tanks

Geo-cellular tanks consist of modular plastic crate units assembled to achieve the specified tank dimensions and volume, wrapped in an impermeable geotextile. A catchpit is provided at the upstream end of the tank to mitigate against the conveyance of silts into the crate units and downstream into the River Medlock.

3.3. Drainage Simulation Results

Models of the proposed drainage network in both the temporary (i.e. Republic only) and permanent condition (Republic, Poulton and MSCP) have been produced in drainage design software Causeway Flow and simulated in the 1 in 1 year, 1 in 30 year and 1 in 100 year (plus 30% and 40% climate change allowance) storm events. A description of the models and discussion of results is provided in this section, with the model schematics and raw simulation outputs for the permanent and temporary models enclosed in Appendix D and Appendix E, respectively.

3.3.1. Description of Models

The models consist of the primary manholes/inspection chambers (nodes) and pipes (links) converted from the drainage BIM model (produced in Civil 3D), with storage modelled as supplementary features to these nodes and links.

Incoming Flows

Incoming flows to the models are generated using catchment areas, which input runoff generated within a defined sub-catchment to a selected node in the model. The nodes to which catchment areas are assigned has been determined based on comparison of the proposed levels shown in drawings 0197_MAY-CIV-SWI-ZZZZ-DR-C-200001 (temporary condition) and 0196_MAY-CIV-SWI-ZZZZ-DR-C-201001 (permanent condition), provided in Appendix B, with the proposed drainage networks.

Rain Gardens

Permanent Condition

A typical rain garden within the permanent model is shown in Figure 2.

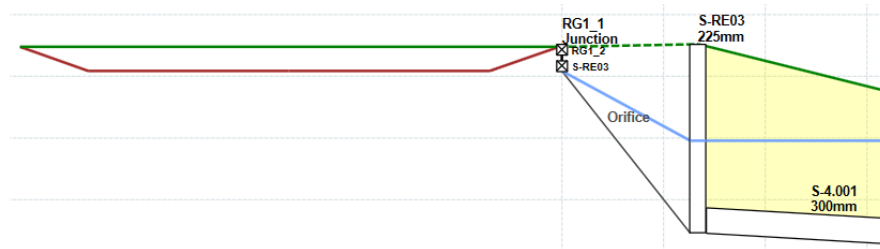


Figure 2. Example rain garden storage feature within drainage model.

The freeboards of proposed rain gardens (in the case of Figure 2, node RG1_1) are modelled as offline storage components with 300mm depth, 1:3 side slopes and 1.0 storage porosity and feature two outflows:

- A primary outflow (e.g., to S-RE03), situated at the bottom of the freeboard depth, is an orifice control representing the flow through the rain garden soils. This has been sized to match the flow rate resulting from the following formula:

$$Q_{max,media} = \frac{K_m \times A_p \times \left(\frac{h_{max}}{d_m} \right)}{3.6 \times 10^6}$$

where:

K_m is the hydraulic conductivity of the filter media (mm/hr),

A_p is the area of the practice (m²),

h_{max} is the total head of water within bioretention components over the perforated pipe (m) (i.e. ponding + mulch + filter media), and

d_m is the depth of the filter media (m)

- A secondary outflow (e.g., to RG1_2), situated at a higher level, represents the overflow pipe from the rain garden or, in the case of rain gardens featuring check dams, the weir overflow.

The outflows loop incoming flow to adjacent rain garden nodes (e.g. RG1_2, where an overflow exists between two features) or into links (e.g. S-4.001, where flow is through soils or an overflow pipe) as appropriate, with the sub-base and sub-soil storage of the rain garden modelled 'online' on the relevant links.

In the case of Figure 2, link S-4.001 is assigned the storage surround detailed in Figure 3. The width of the surround is determined by dividing the plan area of the proposed rain garden by the length of the respective link serving as its underdrain. The surround is assigned a porosity of 0.3, and for the depth of the sub-base, the full width is utilised. Within the depth of the sub-soil, the width is reduced to two-thirds of the full width to account for the reduced porosity of this layer (approx. 0.2).

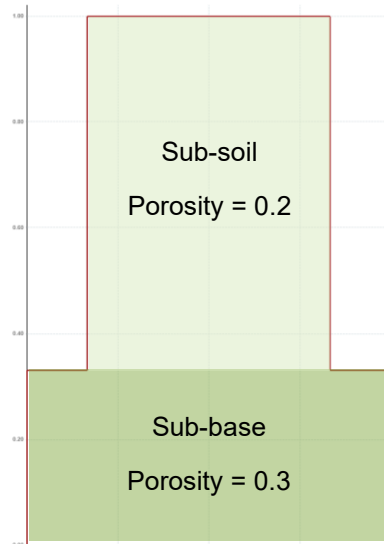


Figure 3. Sub-base/sub-soil storage assigned to rain garden underdrains.

Temporary condition

In the temporary model, the offline freeboard storage is removed from part-constructed rain gardens. Storage surrounds remain on the underlying links, however, only the sub-base portion of this surround is modelled. A 3D view of rain gardens in the permanent and temporary models is provided in Figure 4 to compare their differences.

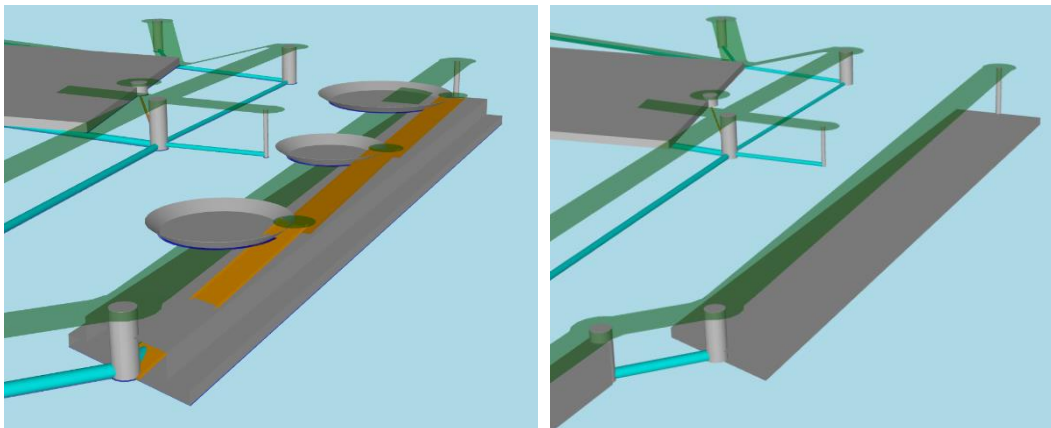


Figure 4. 3D views of rain gardens RG1_1, RG1_2 and RG1_3 in the permanent (left) and temporary (right) drainage models.

Filter Drains

In both permanent and temporary models, filter drains are modelled in a similar manner to Figure 3, but with the surround width set to 675mm and kept constant (i.e., a porosity of 0.3 is present in the entire surround).

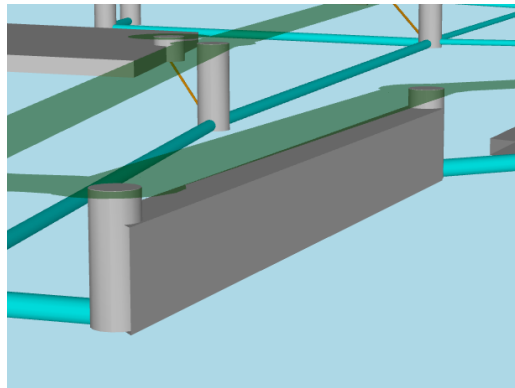


Figure 5. 3D view of a filter drain in the network models. The feature is modelled identically in both the permanent and temporary model.

Pervious Paving

A typical pervious paving feature is shown in Figure 6. The feature is modelled identically in both the temporary and permanent models. Similar to rain gardens, pervious paving has been modelled as an offline feature. In this case only the sub-base is modelled using a 'carpark' feature with a width and length representative of the paving area, a porosity of 0.3, a depth of 300mm and a slope representing the average slope of the proposed paving. An orifice overflow situated at the bottom of the storage represents the orifice control chamber at the outlet of the paving, and routes flows into the primary drainage network.

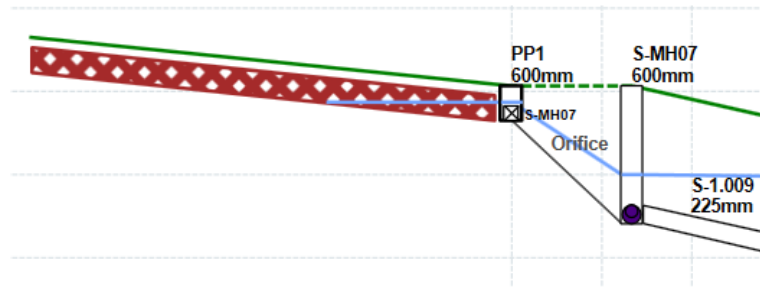


Figure 6. Example pervious paving storage feature within drainage model.

Geo-cellular Tanks

Tanks have been modelled as simple 'depth/area' storage components with porosities of 0.95 and plan area and depths representing the dimensions of proposed tanks. In the temporary condition, Tank 2 (serving the Poulton) is removed from the model.

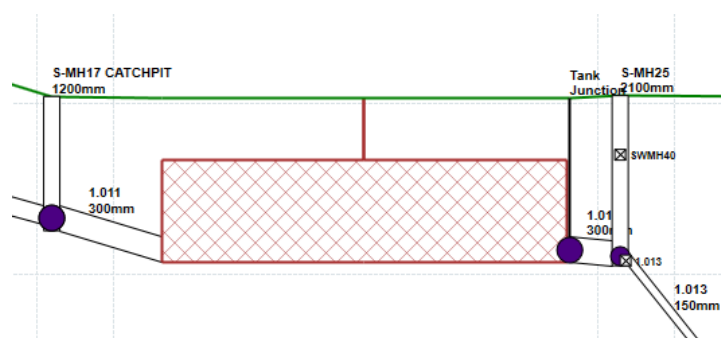


Figure 7. Example tank storage feature within drainage model.

3.3.2. Discussion of Results

Input parameters for simulations of the models are detailed in Table 1.

Table 1. Input parameters for drainage simulations.

Rainfall Methodology	FSR
M5-60	17 mm
r	0.4
C_v (summer)	1.00
C_v (winter)	1.00
Time of Entry	5 mins

Simulations have been carried out for the 1 in 1 year, 1 in 30 year and 1 in 100 year (plus 30% and 40% climate change allowance) storm events, with durations ranging from 15 minutes to 1440 minutes.

River Medlock Outfall

The peak flow rates measured at the River Medlock outfall and modelled flood volume across the site for the critical 1 in 1 year, 1 in 30 year and 1 in 100 year (plus 30% and 40% climate change) storms are shown in

Table 2 for the permanent model, and in Table 3 for the temporary model.

RETURN PERIOD	PEAK FLOW RATE AGREED WITH LLFA (l/s)	PEAK MODELLED FLOW RATE (l/s)	PEAK MODELLED FLOOD VOLUME (m ³)
1 in 1 year	138.68	10.8	0
1 in 30 year	138.68	11.7	0
1 in 100 year (+30%CC)	138.68	69.7	≤1
1 in 100 year (+40%CC)	N/A (simulation requested for assessment of attenuation only)	69.6	3.6

Table 2. Critical peak flow rates and modelled flood volumes for permanent network with outfall to River Medlock.

Table 3. Critical peak flow rates and modelled flood volumes for temporary network with outfall to River Medlock.

RETURN PERIOD	PEAK FLOW RATE AGREED WITH LLFA (l/s)	PEAK MODELLED FLOW RATE (l/s)	PEAK MODELLED FLOOD VOLUME (m ³)
1 in 1 year	138.68	4.3	0
1 in 30 year	138.68	4.3	0
1 in 100 year (+30%CC)	138.68	43.2	0

1 in 100 year (+40%CC)	N/A (simulation requested for assessment of attenuation only)	55.9	3.6
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Permanent Model

In the 1 in 1 year storm event, flows from the Republic and MSCP and surrounding landscaping are restricted to the Q_{BAR} (4.3 l/s). When summed with the outflow from Plot O (7.5 l/s) this results in a peak outflow to the River Medlock of 10.8 l/s in the critical storm duration (60 minute summer). No flooding occurs for all storm durations.

In the 1 in 30 year storm event, the peak discharge from the Poulton remains at 7.5 l/s, however, for approximately 52 minutes in the critical storm duration (180 minute winter), the secondary vortex control serving the Republic and MSCP and surrounding landscaping is triggered, resulting in a total peak outflow of 11.7 l/s to the River Medlock. No flooding occurs for all storm durations.

In the 1 in 100 year plus 30% climate change storm event, the peak discharge from the Poulton remains at 7.5 l/s. For approximately 160 minutes in the critical storm duration (240 minute summer), the secondary vortex control is triggered and reaches its peak design flow of 58 l/s during this period. The peak outflow to the River Medlock is shown to be 69.7 l/s. Small volumes of flooding are recorded at nodes SWMH37 and S-MH31. Both volumes are near negligible ($<1\text{m}^3$) and, as a result of the proposed levels strategy, will be contained within public landscaping and not impact buildings.

Similar results are obtained for the 1 in 100 year plus 40% climate change event, with the peak flow to the River Medlock slightly reducing to 69.6 l/s (likely due to oscillating flow within the model) and flood volumes of 3.6 m^3 and 1.4 m^3 occurring at nodes SWMH37 and S-MH31 in the 120 minute summer and 60 minute summer storm events, respectively. Once again, flooding is anticipated to be contained within public landscaping based on the proposed levels strategy.

In all cases, the peak flow rate is significantly less than the 138.68 l/s discharge rate agreed as part of the Phase 1 Drainage Strategy and satisfies the requirements outlined in BREEAM Pol 03 criteria 6 and 13.

Temporary Model

In the critical 1 in 1 year storm event (30 minute summer) and 1 in 30 year events (60 minute winter), a peak outflow to the River Medlock of 4.3 l/s (Q_{BAR}) is recorded. No flooding occurs for all storm durations.

In the critical 1 in 100 year plus 30% climate change allowance storm event (180 minute summer), a peak outflow to the River Medlock of 43.2 l/s is recorded. This higher rate is reached when the secondary vortex flow control is triggered for approximately 100 minutes. Once again, no flooding occurs for all storm durations.

In the critical 1 in 100 year plus 40% climate change allowance storm event (180 minute summer), a peak outflow of 55.9 l/s is recorded, reached when the secondary vortex flow control is triggered for approximately 108 minutes. 1.4 m^3 of flooding is recorded at node SWMH37 in the 30 minute summer storm and is anticipated to be contained within public landscaping based on the proposed levels strategy.

Highway Outfall

The peak flow rates and modelled flood volumes for the outfall to the existing highway network in Baring Street are shown in Table 4. This drainage network forms part of works associated with the MSCP and Poulton and is therefore only considered in the permanent model.

Table 4. Critical peak flow rates and modelled flood volumes for network draining to highway network.

RETURN PERIOD	EXISTING PEAK FLOW RATE (l/s)	PEAK MODELLED FLOW RATE (l/s)	BETTERMENT ON EXISTING (%)	MODELLED FLOOD VOLUME (m3)
1 in 1 year	11.2	3.5	69	0
1 in 30 year	26.3	5.4	79	0
1 in 100 year (+30%CC)	33.1 (No climate change allowance applied)	7.3	78	<1
1 in 100 year (+40%CC)	33.1 (No climate change allowance applied)	7.3	78	<1

A betterment on existing rates has been determined based on comparison with the existing brownfield discharge rates, which have been calculated in Causeway Flow using the Modified Rational Method (shown for reference in Figure 8) with 2 l/s/ha (approx. 0.134 l/s) subsequently subtracted.

Pre-development discharge

Site Makeup	Brownfield
Brownfield Method	MRM
Contributing Area (ha)	0.067
PIMP (%)	100
CV	1.000
Time of Concentration (mins)	5.00
Betterment (%)	0
Calc	

Return Period (years)	Q (l/s)
1	11.3
30	26.4
100	33.2

Figure 8. Existing brownfield discharge rates for catchments draining to existing highway network.

In the critical 1 in 100 year plus 30% and 40% climate change events, a negligible flood volume is generated at node 7 (the outfall of the rain garden), which is anticipated to be contained within the surrounding soft landscaping.

In all events, the betterment is shown to be greater than the 50% brownfield rate minus 2 l/s/ha requirement agreed within the Phase 1 Drainage Strategy and satisfies the requirements outlined in BREEAM Pol 03 criteria 6 and 13.

3.4. Water Quality Design

Drawing 0197_MAY-CIV-SWI-ZZZZ-DR-C-300003, provided in Appendix C, details the SuDS Management Trains associated with each sub-catchment in the proposed Phase 1a surface water drainage design.

3.4.1. SuDS Management Trains

An assessment of the proposed drainage network's water quality risk management and associated compliance with BREEAM Pol 03 criterion 17 has been undertaken based on the Simple Index Approach presented in Chapter 26 of CIRIA C753.

It is anticipated that suitable mitigation of pollutants likely to be present in generated runoff will be achieved across most of the site. An exception to this is within treatment chain no. 5, where due to various constraints, runoff will not flow through pollution mitigation features except when surcharging of the network occurs. This includes:

- Runoff from the Poulton roof, which has already been agreed to discharge to Tank 1 as part of the masterplan drainage design.
- Runoff from 1no. RWP in the Republic, where coordination with structural foundations has necessitated deeper lateral drains that are too deep to be connected into adjacent SuDS features.
- Runoff from a portion of the proposed access road to the south of the development. The access road is planned to be constructed by a separate contractor prior to the development of Phase 1a and will require connection to a drainage network in the interim. As SuDS features may not be installed until some time after its completion, a direct connection the tank is proposed to be made. Opportunities to drain this portion of the access road to SuDS features in the future will be explored and implemented, where feasible.

The above sub-catchments have a low to very low pollution hazard level, and the pollution risk associated with them is deemed to be low even where it has not been possible to provide full mitigation.

It is also noted that the total suspended solids (TSS) pollutant index in catchments draining to filter drains within Treatment Chain 1 exceed the mitigation index of this feature provided in Table 26.3 of CIRIA C753. However, the filter drains will also include a layer of topsoil and filtration membranes that provide additional filtration that is not believed to be captured within the mitigation index value stated in CIRIA C753 (which is understood to represent a filter drain consisting of coarse graded aggregate only).

Based on the above, compliance with Pol 03 criterion 17 is deemed to have been achieved.

3.4.2. Areas with High Risk of Contamination

BREEAM Pol 03 criteria 18 and 19 state:

“

18. Areas with a high risk of contamination or spillage of substances, such as petrol and oil, have separators installed in surface water drainage systems.

19. Chemical or liquid gas storage areas have a means of containment fitted to the site drainage system (i.e., shutoff valves).

”

No chemical or liquid gas storage areas are proposed and no areas of the site are deemed to possess a high risk of contamination or spillage of substances. The electrical generator proposed within the Republic features an associated tank for storage of diesel generator fuel. The designer of this system, WSP, confirmed on 14th November 2024 that this tank is bunded and therefore any spills would be contained in the unlikely event of a leak.

Criteria 18 and 19 are therefore deemed to be satisfied.

3.4.3. Interception Delivery

BREEAM Pol 03 criterion 16 states:

“

16. There is no discharge from the developed site for rainfall up to 5mm.

”

Compliance with this criterion is typically assessed based on the recommendations of Chapter 24.8 of CIRIA C753. Table 24.6 within this chapter details the conditions required within different SuDS components in which it can be assumed that zero runoff occurs for the first 5mm of rainfall for 80% of summer rainfall events and 50% of winter rainfall events. An excerpt of this table, containing only components relevant to the proposed drainage strategy is provided in Table 5.

Table 5. Excerpt of Table 24.6 of CIRIA C753, containing only SuDS components present in the proposed drainage strategy.

SYSTEMS	INTERCEPTION METHODS THAT CAN BE ASSUMED TO BE COMPLIANT FOR ZERO RUNOFF FOR THE FIRST 5mm RAINFALL FOR 80% OF EVENTS DURING THE SUMMER AND 50% IN WINTER
Permeable pavements	All permeable pavements, whether lined or not, can be assumed to comply, provided there is no extra area drained to the permeable pavement. Where the pavement also drains an adjacent impermeable area, compliance can be assumed for all soil types where the pavement is unlined, as long as the extra paved area is no greater than the permeable paved area. Where the infiltration capacity of the ground below the pavement is greater than 1×10^{-6} m/s, up to 5 times the permeable pavement area can be added as extra contributing area. Where the permeable pavement also drains an adjacent impermeable area and is lined, compliance cannot be deemed to have been achieved and extra downstream Interception components will be required.
Bioretention areas and rain gardens	Areas of the site drained to unlined bioretention components can be assumed to comply where the impermeable surface area is less than 5 times the vegetated surface area receiving the runoff. They can be designed to deliver interception for larger areas, where suitable infiltration capacity is available.

Given the general requirement that features must be unlined to ensure compliance, and that the proposed features will be lined owing to the results of site investigations discussed in Section 3.2.1, compliance for zero runoff is deemed not to have been achieved.

It is noted that the following guidance is provided by BREEAM on criterion 16 (reference KBCN0599):

“

Where ground conditions prohibit the use of SuDS techniques to manage the rainfall onsite or it is not be possible for the first 5mm of rainfall to be prevented from leaving a site completely. An appropriately qualified professional must explain comprehensively why this criterion cannot be fully met and design a system to meet the intent of this criterion as far as possible. Where this can be justified and all other relevant criteria have been achieved, the credit can still be awarded.

”

As discussed in Section 3.4.1 and detailed on drawing 0197_MAY-CIV-SWI-ZZZZ-DR-C-300003 in Appendix C, the majority of catchments drain to features present in Table 5 which, if infiltration were deemed feasible, would provide interception delivery. It is the opinion of Civic Engineers that this represents an intention to meet the criterion as far as possible and that the 'Minimising watercourse pollution' credit should be awarded on this basis.

3.5. Exceedance Flow Design

The proposed exceedance flow design is detailed in drawing 0197_MAY-CIV-SWI-ZZZZ-DR-C-300002, provided in Appendix C. It is shown that runoff will be directed away from buildings in an exceedance flow event.

4. Foul Water Drainage Strategy

The Phase 1 Drainage Strategy prepared by BuroHappold, proposes that the foul water discharge from each plot is collected into a main foul drain and outfalls to an existing United Utilities public combined water sewer within the Mancunian Way (via United Utilities manhole 1407).

A United Utilities' asset map dated 4th January 2024 is provided in Appendix G, for reference. A connection to this sewer was agreed under Section 106 of the Water Industry Act 1991 in an application submitted in September 2023.

Further surveys of this sewer have since revealed it has been abandoned and filled with concrete, which is not shown on the obtained United Utilities asset record. It is presumed this was undertaken as an emergency repair after a sinkhole opened up within the Mancunian Way in August 2015. An alternative connection is currently being agreed and is anticipated to be located further downstream on this network, on the southern side of the Mancunian Way.

In any case, a point of connection for the Phase 1a network is to be provided at the vicinity of the 'placemaking boundary' by BuroHappold, subject to confirmation of the final Phase 1 drainage design, pending approval of a connection to the existing public combined sewer. The above ground drainage serving the plots shall drain to this point of connection via a gravity foul water network, with the exception of basement level drainage which shall be pumped via dedicated package pump stations to the main Phase 1a drainage network, prior to discharging via gravity to the point of connection with the wider Phase 1 network.

Appendix A

Site Wide Landscape Context Plan



- Key**
- Republic Permanent Landscape Boundary
 - Legal Boundary
 - S278 area
 - Future Plot Developments
 - Hatched area indicated where temporary level changes and surfacing are to be installed.
- For further information including levels Refer to Drawings:
0198_MAY-SEW-SW1-ZZZZ-DR-L-001105
- For typical details of paving types Refer to drawings:
0198_MAY-SEW-SW1-ZZZZ-DR-L-001107
- or soft landscape information Refer to drawings:
0198_MAY-SEW-SW1-ZZZZ-DR-L-001109
0198_MAY-SEW-SW1-ZZZZ-DR-L-001110
- For street furniture information Refer to drawings:
0198_MAY-SEW-SW1-ZZZZ-DR-L-001111
- Drawing to be read in conjunction with the specification:
0198_MAY-SEW-SW1-ZZZZ-SPL-007001
0198_MAY-SEW-SW1-ZZZZ-SPL-007002

- Levels**
- 36000 Proposed Levels
 - 36000 Existing Levels
 - TOC 36000 Top of Kerb Levels
- Paving Types**
- P01** Paving Type 01
Description: P01 - Clay Paving Bricks
Please refer to spec clause Q24/120
 - P02** Paving Type 02
Description: P02 - Clay Paving Bricks
Please refer to spec clause Q24/120A
 - P03** Paving Type 03
Description: P03 - Permeable Resin Bound Gravel
Please refer to spec clause Q23/225A
 - P04** Paving Type 04
Description: P04 - Steel Grating
Please refer to drawing:
0198_MAY-SEW-SW1-ZZZZ-DR-L-003105
Please refer to Spec clause Q10/312
 - P05** Paving Type 05
Description: P05 - Temporary asphalt road surface
Please refer to spec clause Q22/140A
 - P06** Paving Type 06
Description: P06 - Gravel
Please refer to spec clause Q23/160A
 - Blister Paving Type 02**
Description: P11 - Blister Waving Paving to cycle stands
Please refer to spec clause Q25/322A

- Trees**
- Proposed Tree**
Size: Semi-mature & Extra Heavy Standard
Refer to soft landscape plan:
0198_MAY-SEW-SW1-ZZZZ-DR-L-001109
 - Existing Tree**
Retained existing trees to be protected and retained in accordance with BS5837:2012.
- Planting**
- Planting Type 01**
Description: Herbaceous, ornamental grass and shrub planting
Refer to Soft Landscape Plan:
0198_MAY-SEW-SW1-ZZZZ-DR-L-001109
 - Planting Type 03**
Description: Rain Garden - Herbaceous, ornamental grass and shrub planting
Refer to Soft Landscape Plan:
0198_MAY-SEW-SW1-ZZZZ-DR-L-001109
 - Planting Type 04**
Description: Existing Rain Garden to be retained
Refer to Soft Landscape Plan:
0198_MAY-SEW-SW1-ZZZZ-DR-L-001109

- Street Furniture**
- Relocated Furniture**
Refer to drawing:
0198_MAY-SEW-SW1-ZZZZ-DR-L-001111
 - Seating Type 01a**
Description: Drifter Bench
Please refer to spec clause Q50/220A
 - Seating Type 01b**
Description: Solid B bench
Please refer to spec clause Q50/221A
 - Seating Type 02a**
Description: Relocated seating bench - single sided
 - Seating Type 02**
Description: Relocated seating bench - Double sided refer to drawing:
0198_MAY-SEW-SW1-ZZZZ-DR-L-001111
 - Cycle Type 01**
Description: Relocated cycle stands
 - Cycle Type 02**
Description: Proposed cycle stands
Refer to spec clause Q50/210A
 - Bin Type 01**
Description: Relocated Bin
 - Bin Type 02**
Description: Proposed Bin
Refer to spec clause Q10/240A
 - Boulder Type 01**
Description: Proposed Boulders
Size: Varied Size (400-2000mm)
N01a - 300mm to 700mm
N01b - 1500mm - 2000mm
UK sourced
Refer to 0198_MAY-SEW-SW1-ZZZZ-DR-L-003110
Refer to Spec clause Q23/160B
 - Bib Tap Type 01**
Description: Proposed Bib Tap
Refer to spec clause Q50/390B
 - Power Socket**
Description: Pop up power socket with recessed access cover
Refer to spec clause Q50/390C
 - Vehicle Barrier**
Description: Automated arm vehicle barrier
Refer to security consultants specification.

- Walls and Balustrade**
- Wall Type 01**
Description: In-situ concrete wall
Finish: Varied Finish to match Mayfield Park
Allowance: 1100mm high powder-coated steel and mesh balustrade to match Mayfield Park
For Typical Balustrade detail to top of wall refer to:
0198_MAY-SEW-SW1-ZZZZ-DR-L-003104

- Lighting**
- Note: Lighting within boundary to be updated by Studio Fractal. Lighting along Estate Road, please refer to Estate Road information.

General Notes

Do not scale from this drawing

All setting out, levels and dimensions to be agreed on site.

The dimensions of all materials must be checked on site before being laid out.

This drawing must be read with the relevant specification clauses and detail drawings

Order of construction and setting out to be agreed on site.

This drawing is copyright protected and may not be reproduced in whole or part without written authority.

All Dimensions are in millimetres unless Otherwise Stated

Services are present in the area. Contractor to establish the precise line and depth of all services prior to commencing any excavation works.

All structural concrete/building work to Engineer's details & dwgs

All dimensions are to finished surface levels

All sub-surface build-ups to Engineer's details

Dwgs not to be scaled. Used dimensioned measurements only. Contractor to check and confirm.

All discrepancies must be reported to and resolved by the Landscape Architect before works commence

All works and materials to be in accordance with current applicable statutory legislation and to comply with all relevant Codes of Practice & British Standards.

Stage 4a DRAFT Status:

Please note this information is not fully coordinated. Only limited engineering was made available during Stage 1 design. The Contractor is to develop their Final proposals based on SEW Design Drawings and Specifications. The Contractors Design Proposals shall include details of their Design, Programming, Method Statements and coordination with all other works. The Contractor is to forward their Final Proposals to SEW to confirm that they meet with SEW Employer's Requirement Proposals.

P04	22/07/24	STAGE 4A (DRAFT)	SE
P03	12/07/24	STAGE 4A (DRAFT)	W
P02	20/05/24	For Coordination	SE
P01	11/08/23	ER DRAFT	W
P00	07/08/23	ER DRAFT	SE
9	02/08/23	For Information	W
8	28/07/23	For Information	SE
7	20/07/23	For Information	W
Rev	Date	Reason for Issue	CH

Keyplan

Scale Bar
0 10m
@ 1:250

Client
Mayfield
Medlock Limited

Project
Mayfield Phase 1_Public Realm

Drawing Title
Site Wide Landscape Context Plan

Studio Egret West
3 Brewhouse Yard
London, EC1V 4JG
hello@egretwest.com
+44 (0) 20 7549 1730

SEW Project Number
0198_MAY

Status
STAGE 4A (DRAFT)

Scale at A1
1 : 250

Date
07/08/23

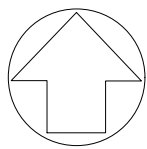
Drawn by
TH

Checked by
SEW

Drawing Number
0198_MAY-SEW-SW1-ZZZZ-DR-L-001100

Appendix B

Proposed Levels Strategies



THE INFORMATION SHOWN HAS BEEN PREPARED PRIOR TO RECEIPT OF RELEVANT STAGE 4A INFORMATION. IT IS BASED ON STAGE 3 INFORMATION CURRENTLY AVAILABLE AT THE TIME OF SUBMISSION. FURTHER COORDINATION IS REQUIRED TO FINALISE THE STAGE 4A PACKAGE AND THE INFORMATION SHOWN IS SUBJECT TO CHANGE PENDING RECEIPT OF OTHER CONSULTANTS' DESIGN INFORMATION.

STANDARD NOTES

1. THIS DRAWING IS TO BE READ IN CONJUNCTION WITH ALL RELEVANT ARCHITECT'S AND ENGINEER'S DRAWINGS AND THE SPECIFICATIONS.
2. THIS DRAWING SHOULD NOT BE SCALED.
3. ALL DIMENSIONS ARE TO BE VERIFIED BY THE CONTRACTOR ON SITE.
4. ALL DISCREPANCIES SHOULD BE REPORTED TO C.A./E.A. PRIOR TO THE COMMENCEMENT OF WORKS.

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KEY

- MAJOR CONTOURS (0.5m) —
- MINOR CONTOURS (0.1m) —
- SPOT LEVEL + 36.150m
- SLOPE (RISE/RUN) ↘ 1:60

PROPOSED LEVELS BASED ON LANDSCAPE ARCHITECT SITE LEVELS FROM DRAWING NUMBER: 0436-SEW-ZZ-00-DR-L-001100

02.02.24	P03	STAGE 4A	CD	CK
14.08.23	P02	PLOT M UPDATED	CD	CK
07.08.23	P01	STAGE 3 ISSUE	CD	CK
DATE	REV	DESCRIPTION	DRAWN	CHKD



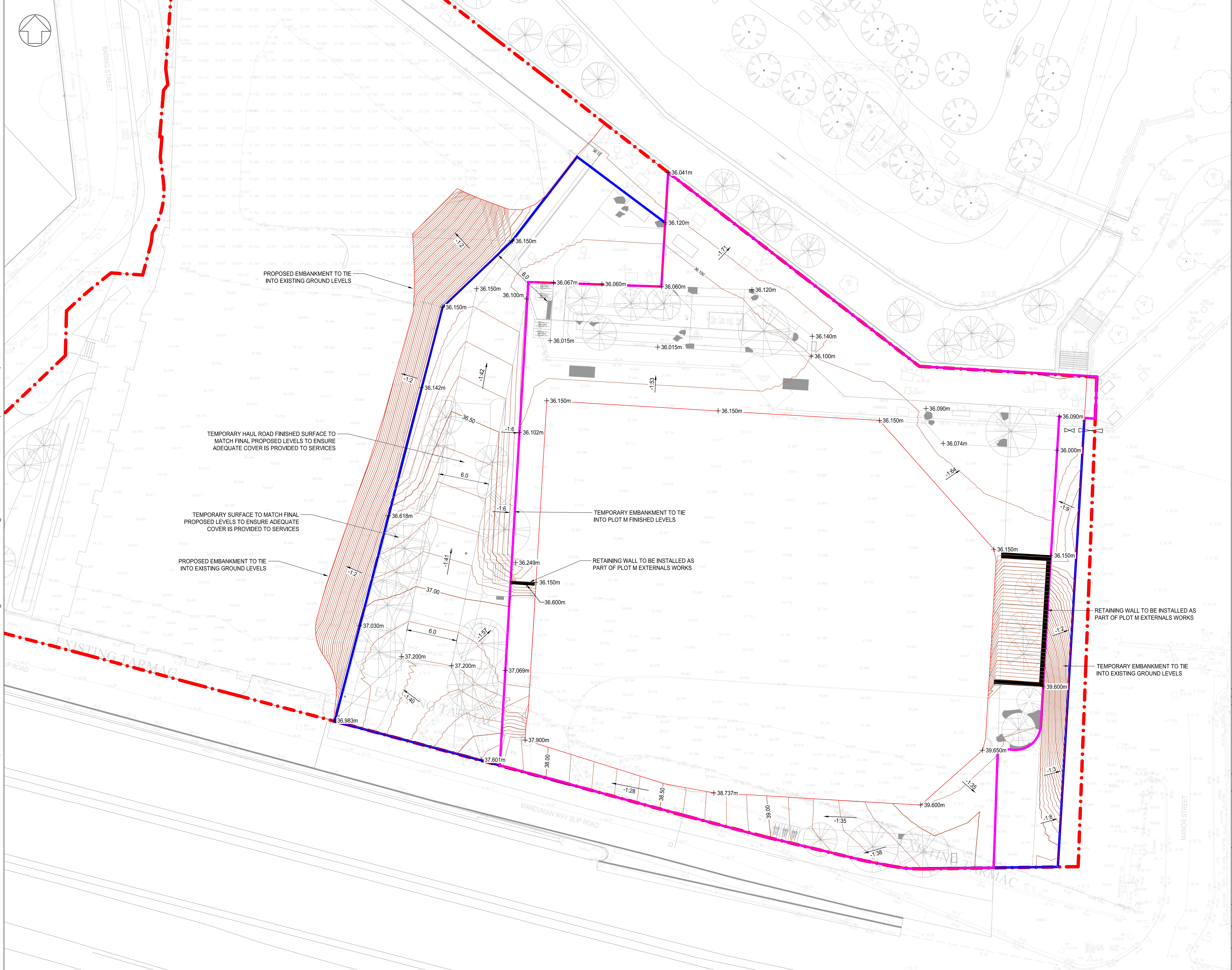
MANCHESTER
LONDON
LEEDS
GLASGOW

PROJECT
MAYFIELD
PHASE 1

TITLE
PROPOSED SITE LEVELS

DRAWING STATUS					STATUS CODE	
STAGE 4A					-	
CE PROJECT No.	SCALE @ A1	DATE CREATED	DRAWN	CHECKED	CD	
1076-27	1:250	13.07.23	CD	CK		
DRAWING No.					REV	
0196_MAY-CIV-SWI-ZZZZ-DR-C-201001					P03	

FILE LOCATION PATH: WFS01\PROJECTS\DRIVE\PROJECTS\HOT1076-27 MAYFIELD, MANCHESTER - PLOT M004 BIM\CIVIL\DRAWINGS\0197_MAY-CIV-SWI-ZZZZ-DR-C-200001_PLOT M PROPOSED FINISHED LEVELS (TEMP HAUL ROAD).DWG



STANDARD NOTES

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4. ALL DISCREPANCIES SHOULD BE REPORTED TO C.A./E.A. PRIOR TO THE COMMENCEMENT OF WORKS.

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KEY

PLOT M WORKS BOUNDARY TO INCLUDE EXTERNALS WORKS SURFACE FINISHES

PLOT M WORKS BOUNDARY TO INCLUDE BURIED SERVICES WITH TEMPORARY SURFACE FINISH

MAJOR CONTOUR (0.5m)

MINOR CONTOUR (0.1m)

-1.42

GRADIENT

+36.293m

SPOT LEVEL

TENDER NOTES

1. WORKS TO WITHIN THE PERMANENT WORKS BOUNDARY THE CONTRACTOR IS TO ALLOW FOR COMPLETION OF ALL WORKS TO THE FINISHED DESIGN INCLUDING PAVEMENT FINISHES AND PLANTING

2. WITHIN THE TEMPORARY WORKS BOUNDARY CONTRACTOR TO ALLOW FOR INSTALLATION OF ALL BURIED SERVICES, DRAINAGE AND SUB-BASE WHICH FORM PERMEABLE SUB-BASES AND RAINGARDEN SUB-BASES.

12.07.24	P01	STAGE 4 ISSUE	CD	CK
DATE	REV	DESCRIPTION	DRAWN	CHKD

CIVIC

ENGINEERS

civicingengineers.com

PROJECT

MAYFIELD PLOT M
THE REPUBLIC
MANCHESTER

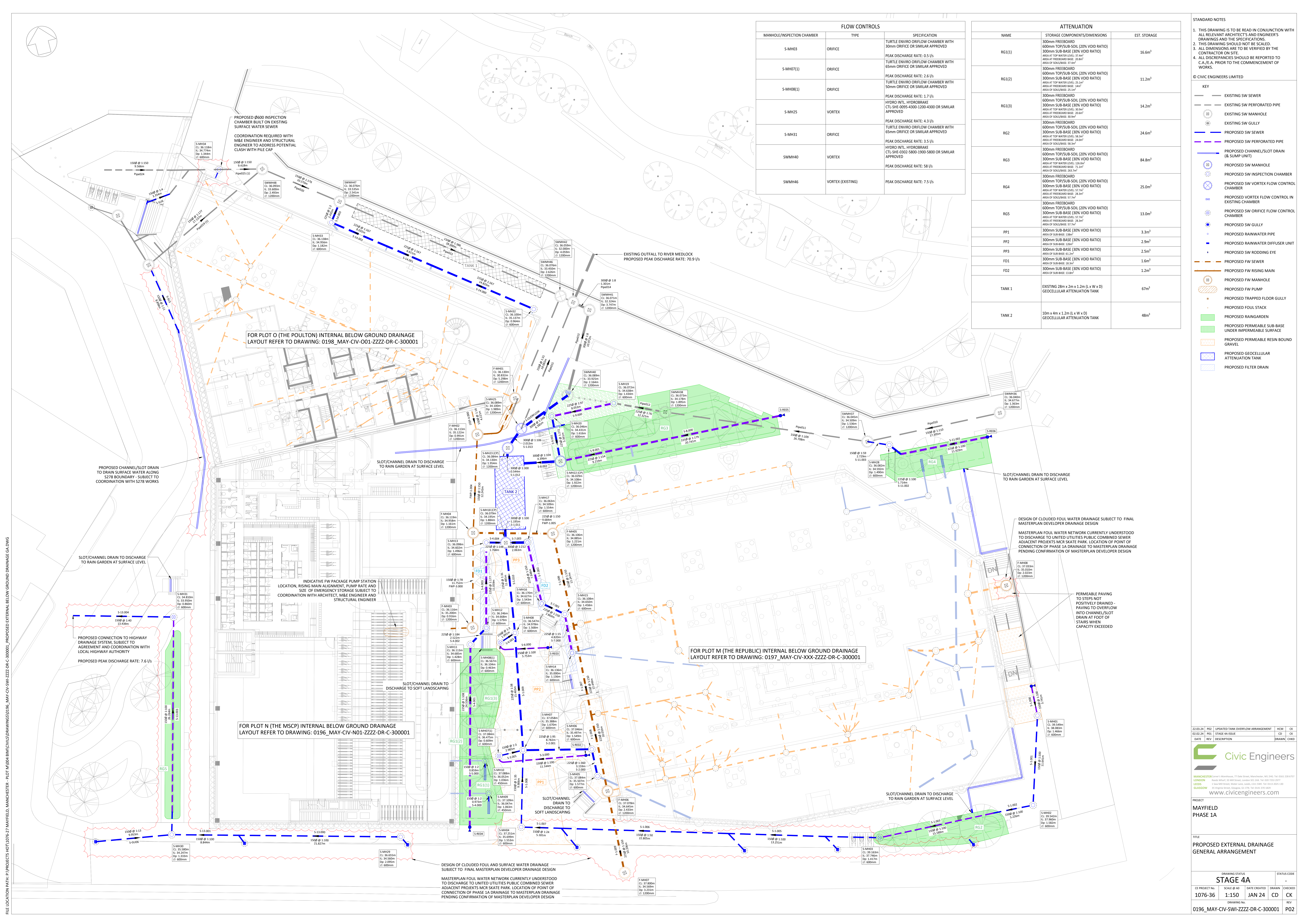
TITLE

PROPOSED FINISHED LEVELS WITH
TEMPORARY CONSTRUCTION ACCESS

DRAWING STATUS				STATUS CODE	
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1076-27	1:200	JULY 2024	CD	CK	
DRAWING No.				REV	
0197_MAY-CIV-SWI-ZZZZ-DR-C-200001				P01	

Appendix C

Proposed Surface Water Drainage



FLOW CONTROLS		
MANHOLE/INSPECTION CHAMBER	TYPE	SPECIFICATION
S-MH03	ORIFICE	TURTLE ENVIRO ORIFLOW CHAMBER WITH 30mm ORIFICE OR SIMILAR APPROVED PEAK DISCHARGE RATE: 0.5 l/s
S-MH07(1)	ORIFICE	TURTLE ENVIRO ORIFLOW CHAMBER WITH 65mm ORIFICE OR SIMILAR APPROVED PEAK DISCHARGE RATE: 2.6 l/s
S-MH08(1)	ORIFICE	TURTLE ENVIRO ORIFLOW CHAMBER WITH 50mm ORIFICE OR SIMILAR APPROVED PEAK DISCHARGE RATE: 1.7 l/s
S-MH25	VORTEX	HYDRO INTL. HYDROBRAKE CTL SHE-0095-4300-1200-4300 OR SIMILAR APPROVED
S-MH31	ORIFICE	TURTLE ENVIRO ORIFLOW CHAMBER WITH 65mm ORIFICE OR SIMILAR APPROVED PEAK DISCHARGE RATE: 3.5 l/s
SWMH40	VORTEX	HYDRO INTL. HYDROBRAKE CTL SHE-0302-5800-1900-5800 OR SIMILAR APPROVED
SWMH46	VORTEX (EXISTING)	PEAK DISCHARGE RATE: 58 l/s

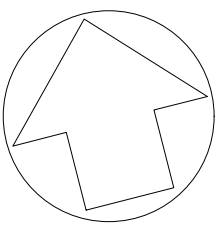
ATTENUATION		
NAME	STORAGE COMPONENTS/DIMENSIONS	EST. STORAGE
RG1(1)	300mm FREEBOARD 600mm TOP/SUB-SOIL (20% VOID RATIO) 300mm SUB-BASE (30% VOID RATIO) AREA AT TOP WATER LEVEL: 21.6m² AREA AT FREEBOARD BASE: 20.8m² AREA OF SOLEBASE: 17.4m²	16.6m³
RG1(2)	300mm FREEBOARD 600mm TOP/SUB-SOIL (20% VOID RATIO) 300mm SUB-BASE (30% VOID RATIO) AREA AT TOP WATER LEVEL: 25.2m² AREA AT FREEBOARD BASE: 24.4m² AREA OF SOLEBASE: 20.3m²	11.2m³
RG1(3)	300mm FREEBOARD 600mm TOP/SUB-SOIL (20% VOID RATIO) 300mm SUB-BASE (30% VOID RATIO) AREA AT TOP WATER LEVEL: 25.2m² AREA AT FREEBOARD BASE: 24.4m² AREA OF SOLEBASE: 20.3m²	14.2m³
RG2	300mm FREEBOARD 600mm TOP/SUB-SOIL (20% VOID RATIO) 300mm SUB-BASE (30% VOID RATIO) AREA AT TOP WATER LEVEL: 58.3m² AREA AT FREEBOARD BASE: 56.8m² AREA OF SOLEBASE: 48.3m²	24.6m³
RG3	300mm FREEBOARD 600mm TOP/SUB-SOIL (20% VOID RATIO) 300mm SUB-BASE (30% VOID RATIO) AREA AT TOP WATER LEVEL: 126.4m² AREA AT FREEBOARD BASE: 124.9m² AREA OF SOLEBASE: 107.3m²	84.8m³
RG4	300mm FREEBOARD 600mm TOP/SUB-SOIL (20% VOID RATIO) 300mm SUB-BASE (30% VOID RATIO) AREA AT TOP WATER LEVEL: 57.7m² AREA AT FREEBOARD BASE: 56.2m² AREA OF SOLEBASE: 47.7m²	25.0m³
RG5	300mm FREEBOARD 600mm TOP/SUB-SOIL (20% VOID RATIO) 300mm SUB-BASE (30% VOID RATIO) AREA AT TOP WATER LEVEL: 57.7m² AREA AT FREEBOARD BASE: 56.2m² AREA OF SOLEBASE: 47.7m²	13.0m³
PP1	300mm SUB-BASE (30% VOID RATIO) AREA OF SUB-BASE: 1.8m²	3.3m³
PP2	300mm SUB-BASE (30% VOID RATIO) AREA OF SUB-BASE: 1.2m²	2.9m³
PP3	300mm SUB-BASE (30% VOID RATIO) AREA OF SUB-BASE: 2.2m²	2.5m³
FD1	300mm SUB-BASE (30% VOID RATIO) AREA OF SUB-BASE: 1.8m²	1.6m³
FD2	300mm SUB-BASE (30% VOID RATIO) AREA OF SUB-BASE: 1.2m²	1.2m³
TANK 1	EXISTING 28m x 2m x 1.2m (L x W x D) GEOCELLULAR ATTENUATION TANK	67m³
TANK 2	10m x 4m x 1.2m (L x W x D) GEOCELLULAR ATTENUATION TANK	48m³

- STANDARD NOTES
- THIS DRAWING IS TO BE READ IN CONJUNCTION WITH ALL RELEVANT ARCHITECT'S AND ENGINEER'S DRAWINGS AND THE SPECIFICATIONS.
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 - ALL DIMENSIONS ARE TO BE VERIFIED BY THE CONTRACTOR ON SITE.
 - ALL DISCREPANCIES SHOULD BE REPORTED TO C.A./E.A. PRIOR TO THE COMMENCEMENT OF WORKS.
- © CIVIC ENGINEERS LIMITED
- KEY
- EXISTING SW SEWER
 - EXISTING SW PERFORATED PIPE
 - EXISTING SW MANHOLE
 - EXISTING SW GULLY
 - PROPOSED SW SEWER
 - PROPOSED SW PERFORATED PIPE
 - PROPOSED CHANNEL/SLOT DRAIN (& SUMP UNIT)
 - PROPOSED SW MANHOLE
 - PROPOSED SW INSPECTION CHAMBER
 - PROPOSED SW VORTEX FLOW CONTROL CHAMBER
 - PROPOSED VORTEX FLOW CONTROL IN EXISTING CHAMBER
 - PROPOSED SW ORIFICE FLOW CONTROL CHAMBER
 - PROPOSED SW GULLY
 - PROPOSED RAINWATER PIPE
 - PROPOSED RAINWATER DIFFUSER UNIT
 - PROPOSED SW RODDING EYE
 - PROPOSED FW SEWER
 - PROPOSED FW RISING MAIN
 - PROPOSED FW MANHOLE
 - PROPOSED FW PUMP
 - PROPOSED TRAPPED FLOOR GULLY
 - PROPOSED FOUL STACK
 - PROPOSED RAINGARDEN
 - PROPOSED PERMEABLE SUB-BASE UNDER IMPERMEABLE SURFACE
 - PROPOSED PERMEABLE RESIN BOUND GRAVEL
 - PROPOSED GEOCELLULAR ATTENUATION TANK
 - PROPOSED FILTER DRAIN

22.03.24	POS	UPDATED RAIN OVERFLOW ARRANGEMENT	HCN	CK
22.02.24	POS	STAGE 4A ISSUE	CK	CK
DATE	REV	DESCRIPTION	DRAWN	CHKD

Civic Engineers

MANCHESTER: 0161 275 1111, 1112, 1113, 1114, 1115, 1116, 1117, 1118, 1119, 1120, 1121, 1122, 1123, 1124, 1125, 1126, 1127, 1128, 1129, 1130, 1131, 1132, 1133, 1134, 1135, 1136, 1137, 1138, 1139, 1140, 1141, 1142, 1143, 1144, 1145, 1146, 1147, 1148, 1149, 1150, 1151, 1152, 1153, 1154, 1155, 1156, 1157, 1158, 1159, 1160, 1161, 1162, 1163, 1164, 1165, 1166, 1167, 1168, 1169, 1170, 1171, 1172, 1173, 1174, 1175, 1176, 1177, 1178, 1179, 1180, 1181, 1182, 1183, 1184, 1185, 1186, 1187, 1188, 1189, 1190, 1191, 1192, 1193, 1194, 1195, 1196, 1197, 1198, 1199, 1200, 1201, 1202, 1203, 1204, 1205, 1206, 1207, 1208, 1209, 1210, 1211, 1212, 1213, 1214, 1215, 1216, 1217, 1218, 1219, 1220, 1221, 1222, 1223, 1224, 1225, 1226, 1227, 1228, 1229, 1230, 1231, 1232, 1233, 1234, 1235, 1236, 1237, 1238, 1239, 1240, 1241, 1242, 1243, 1244, 1245, 1246, 1247, 1248, 1249, 1250, 1251, 1252, 1253, 1254, 1255, 1256, 1257, 1258, 1259, 1260, 1261, 1262, 1263, 1264, 1265, 1266, 1267, 1268, 1269, 1270, 1271, 1272, 1273, 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2104, 2105, 2106, 2107, 2108, 2109, 2110, 2111, 2112, 2113, 2114, 2115, 2116, 2117, 2118, 2119, 2120, 2121, 2122, 2123, 2124, 2125, 2126, 2127, 2128, 2129, 2130, 2131, 2132, 2133, 2134, 2135, 2136, 2137, 2138, 2139, 2140, 2141, 2142, 2143, 2144, 2145, 2146, 2147, 2148, 2149, 2150, 2151, 2152, 2153, 2154, 2155, 2156, 2157, 2158, 2159, 2160, 2161, 2162, 2163, 2164, 2165, 2166, 2167, 2168, 2169, 2170, 2171, 2172, 2173, 2174, 2175, 2176, 2177, 2178, 2179, 2180, 2181, 2182, 2183, 2184, 2185, 2186, 2187, 2188, 2189, 2190, 2191, 2192, 2193, 2194, 2195, 2196, 2197, 2198, 2199, 2200, 2201, 2202, 2203, 2204, 2205, 2206, 2207, 2208, 2209, 2210, 2211, 2212, 2213, 2214, 2215, 2216, 2217, 2218, 2219, 2220, 2221, 2222, 2223, 2224, 2225, 2226, 2227, 2228, 2229, 2230, 2231, 2232, 2233, 2234, 2235, 2236, 2237, 2238, 2239, 2240, 2241, 2242, 2243, 2244, 2245, 2246, 2247, 2248, 2249, 2250, 2251, 2252, 2253, 2254, 2255, 2256, 2257, 2258, 2259, 2260, 2261, 2262, 2263, 2264, 2265, 2266, 2267, 2268, 2269, 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2602, 2603, 2604, 2605, 2606, 2607, 2608, 2609, 2610, 2611, 2612, 2613, 2614, 2615, 2616, 2617, 2618, 2619, 2620, 2621, 2622, 2623, 2624, 2625, 2626, 2627, 2628, 2629, 2630, 2631, 2632, 2633, 2634, 2635, 2636, 2637, 2638, 2639, 2640, 2641, 2642, 2643, 2644, 2645, 2646, 2647, 2648, 2649, 2650, 2651, 2652, 2653, 2654, 2655, 2656, 2657, 2658, 2659, 2660, 2661, 2662, 2663, 2664, 2665, 2666, 2667, 2668, 2669, 2670, 2671, 2672, 2673, 2674, 2675, 2676, 2677, 2678, 2679, 2680, 2681, 2682, 2683, 2684, 2685, 2686, 2687, 2688, 2689, 2690, 2691, 2692, 2693, 2694, 2695, 2696, 2697, 2698



PROPOSED FLOW CONTROLS		
MANHOLE/INSPECTION CHAMBER	TYPE	SPECIFICATION
S-MH03	ORIFICE	TURTLE ENVIRO DRIFLOW CHAMBER WITH 30mm ORIFICE OR SIMILAR APPROVED PEAK DISCHARGE RATE: 0.5 l/s
S-MH07(1)	ORIFICE	TURTLE ENVIRO DRIFLOW CHAMBER WITH 65mm ORIFICE OR SIMILAR APPROVED PEAK DISCHARGE RATE: 2.6 l/s
S-MH08(1)	ORIFICE	TURTLE ENVIRO DRIFLOW CHAMBER WITH 50mm ORIFICE OR SIMILAR APPROVED PEAK DISCHARGE RATE: 1.7 l/s
S-MH25	VORTEX	HYDRO INTL. HYDROBRAKE CTL SHE-0095-4300-1200-4300 OR SIMILAR APPROVED PEAK DISCHARGE RATE: 4.3 l/s
S-MH31	ORIFICE	TURTLE ENVIRO DRIFLOW CHAMBER WITH 65mm ORIFICE OR SIMILAR APPROVED PEAK DISCHARGE RATE: 3.5 l/s
SWMH40	VORTEX	HYDRO INTL. HYDROBRAKE CTL SHE-0302-5800-1900-5800 OR SIMILAR APPROVED PEAK DISCHARGE RATE: 58 l/s

PROPOSED SuDS FEATURES	
NAME	COMPONENTS/DIMENSIONS
RG1(1)	INSTALLATION OF 300mm SUB-BASE (30% VOID RATIO) ONLY AREA OF BASE: 37.4m ²
RG1(2)	INSTALLATION OF 300mm SUB-BASE (30% VOID RATIO) ONLY AREA OF BASE: 75.3m ²
RG1(3)	INSTALLATION OF 300mm SUB-BASE (30% VOID RATIO) ONLY AREA OF BASE: 38.3m ²
RG2	300mm FREEBOARD 600mm TOP/SUB-SOIL (20% VOID RATIO) 300mm SUB-BASE (30% VOID RATIO) AREA AT TOP WATER LEVEL: 58.3m ² AREA AT FREEBOARD BASE: 24.0m ² AREA OF SUB-BASE: 18.3m ²
RG3	300mm FREEBOARD 600mm TOP/SUB-SOIL (20% VOID RATIO) 300mm SUB-BASE (30% VOID RATIO) AREA AT TOP WATER LEVEL: 138.4m ² AREA AT FREEBOARD BASE: 71.3m ² AREA OF SUB-BASE: 205.7m ²
RG4	300mm FREEBOARD 600mm TOP/SUB-SOIL (20% VOID RATIO) 300mm SUB-BASE (30% VOID RATIO) AREA AT TOP WATER LEVEL: 152.2m ² AREA AT FREEBOARD BASE: 28.3m ² AREA OF SUB-BASE: 17.3m ²
PP1	300mm SUB-BASE (30% VOID RATIO) AREA OF SUB-BASE: 138m ²
PP2	300mm SUB-BASE (30% VOID RATIO) AREA OF SUB-BASE: 138m ²
PP3	300mm SUB-BASE (30% VOID RATIO) AREA OF SUB-BASE: 138m ²
FD1	300mm SUB-BASE (30% VOID RATIO) AREA OF SUB-BASE: 18.3m ²
FD2	300mm SUB-BASE (30% VOID RATIO) AREA OF SUB-BASE: 138m ²
TANK 2	10m x 4m x 1.2m (L x W x D) GEOCELLULAR ATTENUATION TANK TANK IL: 33.881m

GENERAL NOTES

- EXISTING DRAINAGE BASED ON AS-BUILT SURFACE WATER PLAN (0042912-BHE-XK-XX-DR-C-7000-3120 AB, REV A), RECEIVED FROM BURHOAPPOLE 03.04.2024. BEFORE STARTING WORK THE CONTRACTOR IS TO CHECK INVERT LEVELS, POSITIONS AND SIZES OF ALL EXISTING DRAIN RUNS, MANHOLES AND OUTFALLS AGAINST INFORMATION SHOWN ON DRAWINGS AND REPORT ANY DISCREPANCIES TO THE ENGINEER.
- ALL DRAINAGE TO COMPLY WITH EXTERNAL BELOW GROUND DRAINAGE SPECIFICATION (0197_MAY-CIV-SWI-100L-SP-C-300001), BUILDING REGULATIONS 2010 APPROVED DOCUMENT H AND DESIGN AND CONSTRUCTION GUIDANCE FOR FOUL AND SURFACE WATER SEWERS OFFERED FOR ADOPTION UNDER THE CODE FOR ADOPTION AGREEMENTS FOR WATER AND SEWERAGE COMPANIES OPERATING WHOLLY OR MAINLY IN ENGLAND.
- ALL DRAINAGE TO BE INSTALLED STRICTLY IN ACCORDANCE WITH THE MANUFACTURER'S INSTRUCTIONS.
- LOCATIONS OF ABOVE GROUND DRAINAGE BASED ON DRAWING 0197_MAY-WSP-M01-100L-DR-P-520101, RECEIVED FROM WSP ON 04.07.2024. SETTING OUT OF DROP DOWNS IS COORDINATED BY THE MEP ENGINEER AND THIS DRAWING SHOULD BE REFERRED TO IN ORDER TO CONFIRM DROP DOWN LOCATIONS.
- ROCKER PIPES SHALL BE USED WHERE PIPES PASS THROUGH OR OVER FOUNDATIONS EXISTING OR NEW.
- ALL EXISTING DRAINS LESS THAN 1.5m DEEP TO BE ABANDONED ARE TO BE GRUBBED OUT AND EXCAVATIONS TO BE FILLED WITH WELL COMPACTED TYPE 1 GRANULAR SUB-BASE MATERIAL. OTHER PIPES SHOULD BE SEALED AND GROUT FILLED TO ENSURE RATS CANNOT GAIN ACCESS AND TO PREVENT SUBSIDENCE OR DAMAGE TO BUILDINGS OR SERVICES IN CASE OF COLLAPSE.
- THE CONTRACTOR IS TO ENSURE THAT ALL EXCAVATIONS DO NOT UNDERMINE THE FOUNDATIONS OF THE EXISTING ADJACENT BUILDINGS.
- ALL COVER LEVELS ARE SUBJECT TO CONFIRMATION FROM THE LANDSCAPE ARCHITECT.
- ALL INTERNAL COVERS TO BE DOUBLE SEALED AND LOCKABLE. ALL COVERS TO BE MINIMUM CLASS B125 OR D400 FOR POTENTIAL HOV TRAFFIC TO BS EN124.
- TEMPORARY DISCHARGE OF SURFACE WATER / GROUND WATER INTO INSTALLED DRAINAGE FEATURES TO BE TREATED AND FREE OF SILTS PRIOR TO CONNECTION. CONTRACTOR TO PROVIDE SUITABLE SILT CONTROL MEASURES.
- DISCHARGE OF TEMPORARY SURFACE WATER INTO THE EXISTING RIVER MEDLOCK TO BE AGREED WITH THE MASTER DEVELOPER AND ENVIRONMENT AGENCY AS REQUIRED.
- CONTRACTOR TO CARRY OUT CCTV SURVEY OF ALL UNDERGROUND DRAINAGE RUNS AFTER ITS COMPLETION, TO CONFIRM CONDITION. ANY ISSUES OR DEFECTS TO BE REPORTED TO C.A./E.A.
- UNLESS NOTED OTHERWISE:
 - FOUL PIPEWORK TO BE UPVC, MIN. Ø100 AND LAID TO MINIMUM SLOPE 1:40
 - SURFACE WATER PIPEWORK TO BE HDPE TWINWALL PIPE, MIN. Ø150 LAID TO MINIMUM SLOPE 1:100.
- ALL PIPEWORK IS TO COMPLY WITH BS EN 1401-1:2019.
- INVERT LEVELS SHOWN ON DRAWINGS ARE CALCULATED BASED ON INCOMING PIPES CONNECTING SOFFIT TO SOFFIT WITH OUTGOING PIPE. LEVELS TO BE ADJUSTED TO PRODUCTS USED.

TENDER NOTES

- FOR WORKS WITHIN THE PERMANENT WORKS BOUNDARY, THE CONTRACTOR IS TO ALLOW FOR COMPLETION OF ALL WORKS TO THE FINISHED DESIGN INCLUDING PAVEMENT FINISHES AND PLANTING.
- FOR WORK WITHIN THE TEMPORARY WORKS BOUNDARY, THE CONTRACTOR IS TO ALLOW FOR INSTALLATION OF ALL BURIED SERVICES, DRAINAGE AND SUB-BASE WHICH FORM PERMEABLE SUB-BASES AND RAIN GARDEN SUB-BASES.
- ATTENUATION TANK DESIGN BASED ON TYPICAL UNIT SIZES AND SHOULD BE VERIFIED BY CONTRACTOR THROUGH EVENTUAL TANK SUPPLIER.
- RAIN GARDENS SHOWN TO INDICATE THE FOOTPRINT OF THE SUB-BASE AND BURIED INFRASTRUCTURE. FINAL TOPSOILING AND SURFACING WITHIN THE TEMPORARY WORKS BOUNDARY TO BE INSTALLED FOLLOWING COMPLETION OF THE MSCP AND POUTLON BUILDINGS.
- ALLOWANCE TO BE MADE FOR TEMPORARY STUB PIPES TO BE CAPPED AND EASILY IDENTIFIABLE FOR FUTURE CONNECTION.

STANDARD NOTES

- THIS DRAWING IS TO BE READ IN CONJUNCTION WITH ALL RELEVANT ARCHITECT'S AND ENGINEER'S DRAWINGS AND THE SPECIFICATIONS.
- THIS DRAWING SHOULD NOT BE SCALED.
- ALL DIMENSIONS ARE TO BE VERIFIED BY THE CONTRACTOR ON SITE.
- ALL DISCREPANCIES SHOULD BE REPORTED TO C.A./E.A. PRIOR TO THE COMMENCEMENT OF WORKS.

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NOTES

- OS BASE PROVIDED BY BURHOAPPOLE, RECEIVED 10.05.2021.
- SITE PLAN (0198_MAY-SFW-SW1-ZZ-DR-I-001100) BY STUDIO EGRET WEST, RECEIVED 10.07.2024.
- PLOT M GROUND FLOOR GENERAL ARRANGEMENT (0197_MAY-MCO-M01-100L-DR-A-001099) BY MORRIS & CO, RECEIVED 14.05.2024.
- STRUCTURAL FOUNDATIONS SHOWN AS PER LATEST INTERNALLY DISTRIBUTED CIVIC ENGINEERS MODEL, DATED 28.05.2024.
- REFER TO 0197_MAY-CIV-SWI-ZZZZ-DR-C-350001 FOR PROPOSED REPUBLIC MANHOLE SCHEDULE.

KEY

- PERMANENT WORKS BOUNDARY
- TEMPORARY WORKS BOUNDARY
- EXISTING SW SEWER
- EXISTING SW PERFORATED PIPE
- EXISTING SW MANHOLE
- EXISTING SW GULLY
- PROPOSED SW SEWER
- PROPOSED SW PERFORATED PIPE
- PROPOSED CHANNEL/SLOT DRAIN (& SUMP UNIT)
- PROPOSED SW MANHOLE
- PROPOSED SW INSPECTION CHAMBER
- PROPOSED SW VORTEX FLOW CONTROL CHAMBER
- PROPOSED VORTEX FLOW CONTROL IN EXISTING CHAMBER
- PROPOSED SW ORIFICE FLOW CONTROL CHAMBER
- PROPOSED SW GULLY
- PROPOSED RAINWATER PIPE
- PROPOSED RAINWATER DIFFUSER UNIT
- PROPOSED SW RODDING EYE
- PROPOSED FW SEWER
- PROPOSED FW RISING MAIN
- PROPOSED FW MANHOLE
- PROPOSED TRAPPED FLOOR GULLY
- PROPOSED FOUL STACK
- PROPOSED RAINGARDEN
- PROPOSED RAIN GARDEN SUB-BASE UNDER TEMP./IMPERMEABLE SURFACE
- PROPOSED PERMEABLE RESIN BOUND GRAVEL
- PROPOSED RESIN BOUND GRAVEL SUB-BASE UNDER TEMP. SURFACE
- PROPOSED GEOCELLULAR ATTENUATION TANK
- PROPOSED FILTER DRAIN

12.07.24	POS	STAGE 4 ISSUE	HCM	CK
DATE	REV	DESCRIPTION	DRAWN	CHKD



PROJECT
MAYFIELD PLOT M
THE REPUBLIC
MANCHESTER

TITLE
PROPOSED EXTERNAL DRAINAGE
GENERAL ARRANGEMENT

DRAWING STATUS		STATUS CODE	
STAGE 4		S2	
CE PROJECT NO.	SCALE @ A0	DATE CREATED	DRAWN
1076-27	1:150	JUL 24	HCM
DRAWING NO.		REV	
0197_MAY-CIV-SWI-ZZZZ-DR-C-300001		P01	

FILE LOCATION PATH: P:\PROJECTS\HOT\LOT6-27 MAYFIELD, MANCHESTER - PLOT M001-BIN\CHIEF'S DRAWINGS\0197_MAY-CIV-SWI-ZZZZ-DR-C-300001 - PROPOSED EXTERNAL BELOW GROUND DRAINAGE GLWGS

DESIGN OF CLOUDED FOUL AND SURFACE WATER DRAINAGE
SUBJECT TO FINAL MASTERPLAN DEVELOPER DRAINAGE DESIGN
MASTERPLAN FOUL WATER NETWORK CURRENTLY UNDERSTOOD
TO DISCHARGE TO UNITED UTILITIES PUBLIC COMBINED SEWER IN
LONDON ROAD. LOCATION OF POINT OF CONNECTION OF PHASE
1A DRAINAGE TO MASTERPLAN DRAINAGE PENDING
CONFIRMATION OF MASTERPLAN DEVELOPER DESIGN