NORTH
Indicative

Proposed Swales

It is proposed that the where possible the apartment block parking areas be served by small swale features, providing amenity, bio-diversity as well as water quality improvement benefits prior to discharging to the proposed surface water sewer network.

Swale Details:
Length - 6.0 m
Width - 3.50 m
Depth - 0.80 m
Side Slope - 1:3
Volume - ~3 m³

Proposed Highway Drain

Highway drain serving proposed junction to Crabtree Lane.

Existing Onsite Sewers to be Abandoned

It is proposed that this length of existing combined sewer be 'grubed-up' & abandoned as part of the proposed development.

Flow Control Chamber Manhole - S17 HB

Hydro International HydroBrake Optimum

S17 HB
Cover level: 81.106 mAOD
Invert level: 78.400 mAOD

Unit
Reference = SHE-0209-2780-2400-2780
Design head = 2.400 m
Restricted discharge max. = 27.80 l/sec
Flow control orifice size = 209 mm

Proposed Surface Water Connection (6903/Existing)

A connection is proposed into the existing Culvert within Crabtree Lane.

Cover level: 80.897 mAOD (From Topo Survey)
Invert level: 74.620 mAOD (From Drainage Survey)
Proposed Connection Invert Level - 78.360 mAOD

Existing Onsite Sewers to be Abandoned

It is proposed that this length of existing combined sewer be 'grubed-up' & abandoned as part of the proposed development.

Proposed Foul Water Connection (6901/Existing)

A connection is proposed into the existing combined water sewer within Eastern Bypass.

Cover level: 80.468 mAOD (From Topo Survey)
Invert level: 77.080 mAOD (From Topo Survey)
Proposed Connection Invert Level - 77.155m mAOD

Proposed Permeable Surfacing

It is proposed that the Apartment Car Parks be permeable construction (block paving / porous asphalt or similar).

The structure surface is to be permeable with a 'tanked' impermeably lined substructure NOT allowing water to infiltrate directly to ground. Run-off is carveyed through the sub-structure, via under-drains, to the surface water network.

Proposed Swales

It is proposed that the where possible the apartment block parking areas be served by small swale features, providing amenity, bio-diversity as well as water quality improvement benefits prior to discharging to the proposed surface water sewer network.

Swale Details:
Length - 6.0 m
Width - 3.50 m
Depth - 0.80 m
Side Slope - 1:3
Volume - ~3 m³

Existing Culverted Asset

Existing Culverted Asset, crosses site East to South West.

Drainage investigation works ***(CCTV)*** have been undertaken to determine connectivity, existing cover levels, invert levels, pipe dia, manhole dia and general condition.

see Drg:
4091-KHNW-DR-A-2000 - Culvert Survey & GPS Overlay.

Maintenance Access

450mm Silt Trap and Air Vent located up and down stream of cells.
See Cellular Storage manufactures details/requirements.

Proposed Off-line Cellular Storage Cells

Cells
CL: 82.925 mAOD
IL: 78.825 mAOD
Activation Water Level = 79.650 mAOD

- **4no.** layers of 400mm deep units. *(Wavin Aquacell or similar approved)*
- Single Cell Unit Size = 1.0m x 0.5m x 0.4m.
- Minimum cover depth - 300mm for landscaped areas. 700mm for car parks with vehicle mass <12 tonnes.
- Plan Area - ~288.50 m².
- 95% void ratio assumed.
- Storage volume provided - ~438.00 m³.

High Level Over Flow-Low Level Return

- HLO invert @ S8 : 79.650 mAOD
- HLO pipe from S8 to Catchpit laid @ 1:60 (6.018m)
- HLO invert @ Catchpit : 79.550 mAOD
- 30yr Water Level @ S8 : 79.645 mAOD
- HLO Twin 300Ø pipe

- LLR invert @ Catchpit : 78.809 mAOD
- LLR pipe from Catchpit to S8 laid @ 1:158 (6.018m)
- LLR invert @ S8 : 78.771 mAOD
- LLR to be fitted with Non-return Valve @ S8

- Catchpit to have 450mm sump

Proposed Permeable Surfacing

It is proposed that the Private & Shared Driveways be permeable construction (block paving / porous asphalt or similar).

The structure surface is to be permeable with a 'tanked' impermeably lined substructure NOT allowing water to infiltrate directly to ground. Run-off is conveyed through the sub-structure, via under-drains, to the surface water network.

Existing Overflow

Assumed overflow from the Ashton Canal, connecting to the existing culvert crossing site.

Drainage investigation works ***(CCTV)*** have been undertaken to determine connectivity, existing cover levels, invert levels, pipe dia, manhole dia and general condition.

see Drg:
4091-KHNW-DR-A-2000 - Culvert Survey & GPS Overlay.

Proposed Permeable Surfacing

It is proposed that the Apartment Car Parks be permeable construction (block paving / porous asphalt or similar).

The structure surface is to be permeable with a 'tanked' impermeably lined substructure NOT allowing water to infiltrate directly to ground. Run-off is conveyed through the sub-structure, via under-drains, to the surface water network.

Existing Culverted Asset

Existing manholes on the Culverted Asset, are to have the cover levels raised inline with the proposed finished levels.

Existing Cover Levels in *Italics*.
Proposed Cover Levels in **Bold**.

Drainage Strategy - Foul water

The proposed foul water drainage network for the development is designed to connect into the existing sewer infrastructure. Specifically, the foul water from the site will be directed to the existing United Utilities sewer (**MH Ref: 6901**) located adjacent to the southern boundary of the site.

Existing United Utilities Manhole:

MH Ref: **6901**
Cover Level (CL): 180.468 mAOD
Invert Level (IL): 77.150 mAOD (150mm Ø - *Proposed*)
Invert Level (IL): 77.080 mAOD (225mm Ø - *Existing*)

Approval to connect into the existing combined sewer network must be confirmed with United Utilities as part of a pre-development enquiry.

Drainage investigation works ***(CCTV)*** have been undertaken confirm the existing cover levels, invert levels, pipe diameters, manhole dimensions, and the overall condition of the system.

Drainage Strategy - Surface water

Surface water from the development site will discharge into the existing surface water culvert (**MH Ref: 6903**) located within the southern most bellmouth into the site.

Proposed Discharge Manhole:

MH Ref: **6903**
Cover Level (CL): 80.970 mAOD
BD Level (IL): 78.516 mAOD (300mm Ø - *Proposed*)
Invert Level (IL): 74.620 mAOD (600mm Ø - *Existing*)

The surface Water pipe network has been designed to cater for 1:30yr with off-online attenuation cells serving the 1:100yr+45% Climate Change event.
A Green SUDs based attenuation feature such as a pond/ basin is not viable due to constraints from proposed levels/site fall, connection level & simulated water levels within the proposed pipe network.

Approval to connect into the existing surface water culvert must be confirmed with United Utilities, LLFA & Canal & River Trust prior as part of a pre-development enquiry.

Drainage investigation works *(CCTV)* have been undertaken confirm the existing cover levels, invert levels, pipe diameters, manhole dimensions, and the overall condition of the system.

Health & Safety Notes:

Ground Investigation:
A detailed ground investigation should be undertaken to fully understand site conditions. A thorough investigation is required before any deep excavation to assess ground stability and potential contamination risks.

Service Detection:
Before commencing any excavation, a comprehensive service detection survey must be conducted to locate existing utilities, including gas, water, electricity, and telecommunications. Any identified services must be clearly marked on-site, and appropriate protective measures should be implemented.

Surface Water Management:
The site has variable surface water flood risks. All construction and drainage works must ensure the safe management of surface water, maintaining existing flow routes and avoiding potential flood risk areas. Proper coordination is required to prevent any adverse impacts on drainage infrastructure and to ensure compliance with health and safety standards.

Warnings:

Works Near Potential Culverted Watercourse:
There is potential that a culvert crossing the site is a culverted watercourse. Appropriate investigations must be undertaken to determine its status and condition. Excavation or construction near the culvert should proceed with caution to avoid structural damage, unexpected water ingress, or instability. Protective measures and temporary works must be in place to safeguard personnel and the integrity of the culvert.

Works Adjacent to the Canal:
A canal is present along the northern boundary of the site. Construction activities near the canal should consider stability risks, potential for water seepage, and protection of the embankment. Proper working methods, including bank reinforcement where necessary, must be employed to mitigate risks.

Sewer Depths and Locations:
The exact location, depth, and condition of existing sewers have not been fully verified. A CCTV survey is required to confirm these details. Caution must be exercised when working near these infrastructures, and excavation must follow best practice guidelines to prevent damage or disruption.

Existing Infrastructure/Services:

Potential Abandoned Sewers:
Given the site's former industrial use, there is potential for abandoned or unknown sewers to be present. A thorough investigation, including historical mapping and a CCTV survey, should be undertaken to confirm the presence, location, and condition of any such infrastructure. All construction activities should consider the possibility of unidentified drainage routes or legacy connections. Appropriate measures should be taken to prevent disturbance to any remaining infrastructure and mitigate any associated risks.

Utilities:
Existing utilities, including electrical and water lines, are present on the site. A detailed utilities plan must be consulted, and all services should be marked and protected during construction. Coordination with utility providers may be necessary to ensure safe working conditions.

Legend

- Development boundary
- Proposed adoptable Surface Water Sewer
- Proposed 100yr Cellular Storage
- Highway Sewer & Manhole
- Highway Gully & Connection Pipe Work
- Proposed adoptable Foul Water Sewer
- Proposed Sewer Easement *(3m from Centre line)*
- Existing Asset *(Assumed Ordinary Watercourse)*
- Existing Asset Offset
- Existing Combined Sewer (Private)
- FFL 134.65 — Proposed Finished Floor Level
- +133.70 — Existing Boundary Ground Level
- +17.100 — Proposed Spot Level
- Proposed Earthwork Batter
- 4C — Underbuild - Measured from FFL to PGL
- 3C — Tanking - Measured from FFL to PGL
- FOE - 0.150m — Flag on Edge (up to 450mm)
- RET - 0.500m — Masonry Retaining Wall (over 450mm)

Notes

1. Planning layout ref. Keepmoat Homes - 4091-KHNW-DR-F-1000-Planning Layout.
2. Topographical survey provided by 'SurveyEng Ltd', ref 'MCLTS.115_E Crabtree Lane, Openshaw - Topo Survey', Dated June 2021.
3. Road detail, levels and layout are subject to local authority section 38 Highways approval.

NOTES

CONNECTIONS

1. All SVP, RWP and BIG connections are indicative and must be confirmed by architect.
2. All surface water / gully connections on combined systems to be trapped.
3. Pipe gradients out of building to connecting manhole to be laid an 1:40 in accordance with Part H of the 2002 Building Regulations, Table 6. All inverts to SVP within 3 storey buildings must be 750mm in accordance with Building Regulations.

PIPEWORK

1. Where surface and foul water pipe sizes are not indicated the diameter is to be ø100 unless stated otherwise.
2. Where surface water pipe gradients are not indicated a ø100 pipe is to be laid no shallower than 1:100 and a ø150 pipe is to be laid no shallower than 1:150.
3. Where foul water pipe gradients are not indicated a ø100 pipe is to be laid no shallower than 1:80, with the exception of the first connection that is to be laid at 1:40, a ø150 pipe is to be laid no shallower than 1:150.

INSPECTION CHAMBERS & MANHOLES

1. Manhole covers to be marked "FWS" or "SWS" as appropriate.
2. Brickwork to manholes to be english bond.
3. All manhole covers and frames must comply with BS EN124. Covers in roads to be grade D400 and be 150mm deep. Manhole covers in car parking areas and drives to be grade B125, whilst landscaped areas may be grade A15. All to be sized in accordance with Part H of Building Regulations:2002, Tables 11 & 12.
4. Precast concrete chamber rings to be reinforced.

BACKDROPS

1. Backdrops in the private manholes / inspection chambers to be internal.
2. Backdrops in the main drainage system being offered for adoption are to be in accordance with Sewers for Adoption 7th Edition - for additional information see Drainage Construction Details drg.

BEDDING AND SURROUND

1. Private sewers located under adopted / private roads to be Class S Granular Bed and Surround with a minimum of 1.2m cover. Where this cannot be achieved a Class Z Concrete Bed and Surround is to be provided. - for additional information see Road Construction Details drg.
2. Private sewers located under landscaped areas or driveways / car parking bays to be Class F Granular Bed and Surround with a minimum of 0.6m cover. Where this cannot be achieved a Class Z Concrete Bed and Surround is to be provided. - for additional information see Road Construction Details drg.

SERVICES

1. All underground services to be confirmed by contractor prior to commencement on site. Any discrepancies to be reported to engineer.

NHBC Standards
Effective from 1st January 2025

*****IMPORTANT** - Invert levels at proposed points of connection are **to be confirmed prior** to any works commencing on site as onsite drainage and slab levels may be affected***

The adoptable drainage and highway works are subject to technical approval by Last Mile Water and Manchester City Council respectively and may therefore change

I	24.03.26	Road gully positions reviewed & amended	CP
H	17.03.26	Cover levels @ FH & S4 changed Permeable surface note updated to reference the Apartment Car Parks only	CP CP
G	11.03.26	New Layout Rev F. VE comments on Main Drainage	CP
F	13.02.26	Culvert Easement reviewed in accordance with UU's Easement Local Practice document.	CP
E	05.02.26	Reference to proposed combined sewers removed	CP
D	31.10.25	Updated with revised Site Layout	CP
C	07.10.25	Updated with revised Planning Layout Swales removed. Proposed coves indicated on Culvert Manholes	CP
B	02.10.25	External Works updated (GB changed to FOE)	CP
A	24.09.25	First issue to client	CP

Revision History

Drawing originator:

BETTS HYDRO CONSULTING ENGINEERS · BETTS ASSOCIATES CONSULTING ENGINEERS · BETTS GEO CONSULTING ENGINEERS

Client: Keepmoat Homes

Project title: Crabtree Lane, Manchester

Drawing title: Section 104 Main Drainage Layout

Scale: 1:300 for the original size of A0
Drawn by: CP | Checked by: - | Passed by: RA | Date: Sep 25
Drawing status: Preliminary

Job No:	Drawing No: Project	Origin	Volume	Level	Type	Discip	Number	Revision:
KMH28	xx	BET	xx	xx	xx	C	101	I

4-7 Old Marsh Farm Barns, Welsh Road, Sealand, Flintshire, CH5 2LY
enquiries@bettsassociates.co.uk
Chester 01244 288178 | Altrincham 0161 4183331