DRAINAGE STRATEGY REPORT
In response to outline planning condition 30 (ref: 2019/1573)

Gateway 36 – Unit 4
Dearne Valley Parkway, Barnsley.

Reference	AMF/DS/Y22039.v1
Date	November 2022

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Confidentiality Statement

This report is addressed to and may be relied upon by the following:

EOS INC. LTD
Advantage House
Poplar Way
Rotherham
South Yorkshire
S60 5TR

This report has been prepared for the sole use and reliance of the above-named parties. This report shall not be relied upon or transferred to any other parties without the express written authorisation of RWO Group. No responsibility will be accepted where this report is used, either in its entirety or in part, by any other party.

Document History

VERSION	PURPOSE/DESCRIPTION	DATE
1	First Issue	17.11.2022

1.0 INTRODUCTION

RWO Group (RWO) has been instructed by EOS INC. LTD to prepare a Drainage Strategy report to support a reserved matters planning application for proposed Unit 4 on the Gateway 36 development site on land off Dearne Valley Park, Rockingham, Barnsley. The report is in response to the specific requirements of condition 30 of the outline planning consent ref: 2019/1573.

2.0 CONDITION 30 – OUTLINE PLANNING CONSENT 2019/1573.

Condition 30 states the following:

'Each reserved matters application shall be accompanied by a scheme which sets out;

1. *Full foul and surface water details*
2. *Works to provide outfall of surface water*
3. *Full details of the relevant phases of Sustainable Urban Drainage including attenuation, storage, and treatment capacities as detailed in the CIRIA SUD Manual (C697)*
4. *The scheme shall include the following detail;- Information about the design storm period and intensity, the method employed to delay and control the surface water discharged from the site and the measures taken to prevent pollution of the receiving groundwater and/or surface waters;- A timetable for its implementation;- and – A management and maintenance plan for the lifetime of the development which shall include the arrangements for adoption by the public authority of statutory undertaker or any other arrangements to secure the operation of the scheme throughout its lifetime.*

The development of each phase shall thereafter be implemented in accordance with the approved sustainable urban drainage scheme and maintained thereafter in accordance with the approved management and maintenance plan.

Reason: To ensure proper, sustainable drainage of the area in accordance with Local Plan Policy CC3 and CC4 and to reduce the risk of contaminating surface water run-off and to reduce the risk of localised flooding and downstream flooding in accordance with Local Plan policy Poll1 Pollution Control and Prevention.

3.0 RWO RESPONSE TO CONDITION 30

RWO response to condition ref *1. Full foul and surface water details*

Foul and surface water drainage is detailed on RWO drainage layout drawings Y22039-D200 & D201 provided in Appendix A and is summarised below.

Foul water

Foul water from the new buildings will discharge to the foul infrastructure sewer in the access road, constructed under BMDC planning consent ref: 2021/1005. A copy of the infrastructure drainage drawings covered under this planning consent are included in Appendix B.

Surface water

The principles of surface water drainage for the site are in accordance with the details set out in JPG Consulting Engineers Drainage and Flood Risk Statement (ref: 4652-2-JPG-XX-XX-RP-D-0620-S2-P01) which accompanied the outline planning application. A copy of the report is provided in Appendix C.

Surface water discharge from the Gateway 36 development site is restricted to the equivalent greenfield discharge rate of 62.2 litres/second discharging to a tributary of Short Wood Dike to the west of the site. Due to the surface water flow restriction surface water attenuation will be provided in the form of an open attenuation basin located to the west of the site adjacent to the watercourse. Details of the attenuation basin are presented on JPG drawing no. 4652-2-SW-00-DR-D-1451-S2-P03 provided in Appendix D.

As advised in the JPG Drainage and Flood Risk Statement the attenuation basin has been designed to accommodate up to and including a 1:100-year return period storm including an allowance of 30% for the future effects of climate change.

The attenuation basin was constructed under a site infrastructure works contract.

The attenuation basin will be retained by the site developer and maintained under an agreement with a facilities management company.

Unit 4 covered under the reserved matters planning application will be drained to the surface water infrastructure sewers within the new access road to the immediate north which drains to a surface water drainage swale before discharging to the attenuation basin. As there are no fixed layouts for the development of the remainder of the site the swale has been provided to allow flexibility of the development layout. Ultimately the swale will be abandoned and a piped outfall to the basin constructed once the site layout is finalised.

RWO response to condition ref *2. Works to provide outfall of surface water.*

As noted above surface water will discharge to a tributary of Short Wood Dike to the west of the site via a reinforced concrete headwall. Details of which are basin are presented on JPG drawing no. 4652-2-SW-00-DR-D-1451-S2-P03 provided in Appendix D.

RWO response to condition ref *3. Full details of the relevant phases of Sustainable Urban Drainage including attenuation, storage, and treatment capacities as detailed in the CIRIA SUD Manual (C697)*

The attenuation basin was constructed under a site infrastructure works contract and completed 2021.

As advised in the JPG Drainage and Flood Risk Statement the attenuation basin has been designed to accommodate up to and including a 1:100-year return period storm including an allowance of 30% for the future effects of climate change.

RWO response to condition ref *4. The scheme shall include the following detail;- Information about the design storm period and intensity, the method employed to delay and control the surface water discharged from the site and the measures taken to prevent pollution of the receiving groundwater and/or surface waters;- A timetable for its implementation;- and – A management and maintenance plan for the lifetime of the development which shall include the arrangements for adoption by the public authority of statutory undertaker or any other arrangements to secure the operation of the scheme throughout its lifetime.*

As advised in the JPG Drainage and Flood Risk Statement the attenuation basin has been designed to accommodate up to and including a 1:100-year return period storm including an allowance of 30% for the future effects of climate change. Flows from the basin will be restricted by a proprietary flow control device located in a chamber before connection to the watercourse.

The Environment Agency updated climate change allowances in May 2022, which indicates a climate change allowance of 40% for the area.

The Unit 4 site drainage system shall be designed in accordance with the requirements of Codes for Adoption and shall demonstrate that:

- No surcharge of pipes occurs in the 1 in 2-year rainfall event.
- No surface flooding occurs in 1 in 30-year rainfall event.
- No flooding to buildings and adjacent properties occurs in 1 in 100-year rainfall event (including an allowance of 40% for the effects of future climate change), as defined in NPPF Technical Guidance.

As this development is for commercial end-use, urban creep has been excluded, as any future amendments or extensions of the site will require a further planning application.

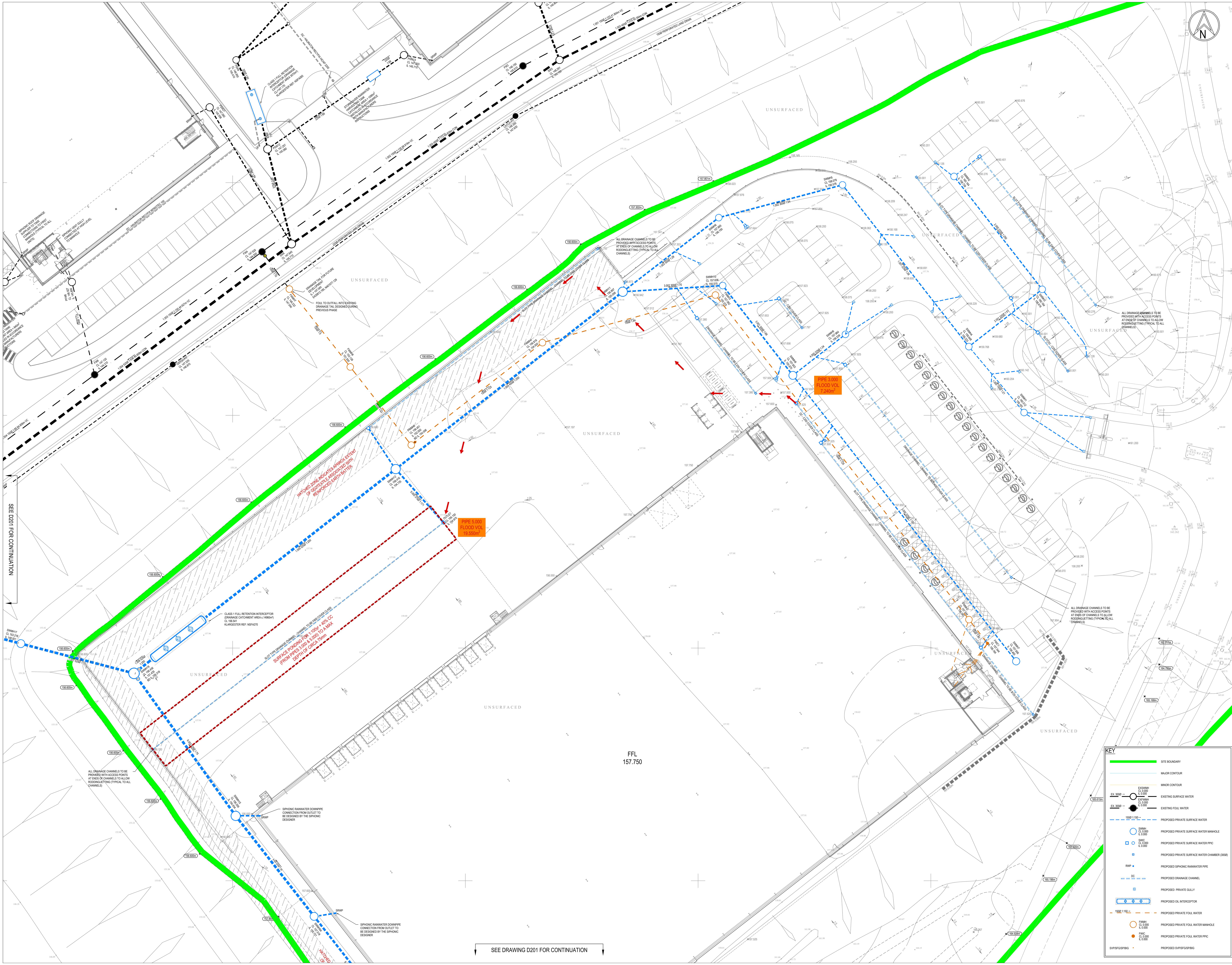
Flood routing is indicated on the RWO drainage layout drawings included in Appendix A.

Surface water runoff from the service yard and car parking area will be passed through a full retention/bypass separator before discharging to the infrastructure surface water drainage system. The location of the separators is indicated on the drainage layout drawings provided in Appendix A.

A Drainage Maintenance and Management plan is included in Appendix E providing details of maintenance procedures for various elements of the drainage along with recommended timescales for maintenance activities.

Andrew Fairburn
For and behalf of RWO Group

Appendix A RWO Drainage Layout Drawings



GENERAL SAFETY NOTES:

1. WHERE THE BASE (ROAD BASE) HAS BEEN USED AS A TEMPORARY RUNNING SURFACE DURING THE CONTRACT IT SHALL BE THOROUGHLY CLEANED AND POWER WASHED AS NECESSARY. AFTER DRYING AND IMMEDIATELY BEFORE THE BINDER COURSE IS LAID A TACK COAT OF BITUMEN EMULSION CLASS A1-40 OR K1-40 TO BS434 SHALL BE APPLIED AT A RATE OF 0.35-0.55 LITRES/SQ METER.
2. ALL RADIUS KERBS WITH A RADIUS OF 12m OR LESS SHALL BE FORMED WITH PROPRIETARY RADIUS KERBS.

HEALTH & SAFETY:

1. CONTRACTOR SHOULD BE AWARE OF GENERAL CONSTRUCTION RISKS TO PREVENT SLIPS, TRIPS AND FALLS AND TAKE NECESSARY PRECAUTIONS WITHOUT SPECIAL INSTRUCTION.

ROADS & DRAINAGE

2. CONTRACTOR TO PROVIDE TRENCH SUPPORTS AS APPROPRIATE AND ENSURE THAT PLANT REMAINS A SAFE DISTANCE FROM TRENCHES PRIOR TO INSTALLING DRAINAGE
3. THE TIME THAT EXCAVATIONS ARE OPEN ON SITE SHOULD BE KEPT TO A MINIMUM AND ALL TRENCHES SHOULD BE SURROUNDED BY A BARRIER.
4. CONNECTIONS TO EXISTING SEWERS TO BE MADE BY APPROVED CONTRACTOR ONLY.
5. CONTRACTOR TO MAKE OPERATIVES AWARE OF ASSOCIATED DANGERS TO HEALTH SUCH AS LEPTOSPIROSIS (WEILS DISEASE) AND RECOMMENDED PRECAUTIONS. ADEQUATE WELFARE FACILITIES AND PROTECTIVE CLOTHING TO BE PROVIDED AS REQUIRED.
6. UNFINISHED MANHOLES MUST BE COVERED WITH LOAD BEARING MATERIALS AND SURROUNDED WITH BARRIER.

PIPES & CABLES

7. CONTRACTOR TO OBTAIN ALL SERVICE RECORDS PRIOR TO WORKS COMMENCING.
8. SERVICE RECORDS TO BE REFERRED TO PRIOR TO WORK COMMENCING. CONTRACTOR TO PROCEED WITH CAUTION AND SERVICES TO BE LOCATED BY HAND DIG AND PROTECTED ACCORDINGLY.

EXCAVATION/FILL

9. CONTRACTOR TO ENSURE RELEVANT MEASURES ARE TAKEN TO KEEP PLANT AND PEOPLE A SAFE DISTANCE FROM STEEP SLOPES DURING THE WORKS.
10. CONTRACTOR TO ENSURE THAT PROCEDURES ARE IN PLACE TO KEEP PEOPLE A SAFE DISTANCE FROM WORKING PLANT WHERE NECESSARY.
11. CONTRACTOR TO REFER TO GROUND INVESTIGATION REPORT FOR CONTAMINATION TESTS AND TO PROVIDE ADEQUATE WELFARE FACILITIES AND PROTECTIVE CLOTHING AS REQUIRED.

DRAINAGE SPECIFICATIONS FOR YORKSHIRE WATER

1. ALL ADOPTABLE SEWER WORKS AND MATERIALS TO BE IN ACCORDANCE WITH "CODE FOR ADOPTION", THE RELEVANT BRITISH/EUROPEAN AND YORKSHIRE WATER'S STANDARDS/REQUIREMENTS/ADDENDUM TO THE MECHANICAL AND ELECTRICAL SPECIFICATION AND KITEMARKED.
2. MANHOLE COVERS SHALL/MUST HAVE A CLEAR OPENING OF 600mm AND SHALL BE CLASS D400 TO BS EN 124 WITH 150mm DEEP FRAMES IN HIGHWAYS.
3. FILLED GROUND MUST BE FILLED AND CONSOLIDATED UNDER THE SUPERVISION AND TO THE SATISFACTION OF YORKSHIRE WATER BEFORE ANY SEWER WORKS ARE CARRIED OUT.
4. YORKSHIRE WATER IS NOT OBLIGED TO ACCEPT FILTER DRAIN/LAND DRAINAGE RUN-OFF INTO THE PUBLIC SEWER NETWORK OR ADOPTABLE DRAINAGE SYSTEM (**DIRECTLY OR IN-DIRECTLY**). AN ALTERNATIVE METHOD OF DISPOSAL OF THE LAND DRAINAGE RUN-OFF WILL THEREFORE BE REQUIRED AND YOU WILL HAVE TO LIAISE WITH THE LOCAL AUTHORITY, LAND DRAINAGE SECTION WITH REGARD TO THE DISPOSAL OF THE FILTER DRAIN/LAND DRAINAGE RUN-OFF.
5. COVER SLABS MUST CARRY THE BSI KITEMARK OR WILL BE REJECTED BY YORKSHIRE WATER INSPECTOR. WHERE THE CLEAR OPENING OF THE KITEMARKED PRODUCT IS DIFFERENT TO THAT OF THE COVER AND FRAME, A LOADING BEARING SLAB SHOULD BE FITTED ABOVE THE COVER SLAB TO BRING THE SIZE DOWN TO 600mm X 600mm FOR THE YORKSHIRE WATER SPECIFIED COVER SIZE. PLEASE REFER TO CONCRETE PIPE SYSTEMS ASSOCIATION (**CPSA**), 'TECHNICAL BULLETIN' ISSUED AUTUMN 2004 FOR KITEMARKED COVER SLAB OPENING SIZES.
6. SULPHATE RESISTANT CEMENT (**C20-DC2**) AND PRECAST CONCRETE PRODUCTS MUST BE USED OR A LABORATORY REPORT PROVIDED PROVING THAT SUCH PRECAUTIONS ARE NOT NECESSARY.
7. THE ADOPTABLE SEWERS SHOULD BE A MINIMUM OF 1m AND MANHOLES 0.5m FROM KERB FACES AND SERVICE MARGINS.
8. SEWERS MUST HAVE 5 METRES CLEARANCE FROM TREES AND HEDGES OR THE WIDTH OF THE CANOPY AT MATURE HEIGHT.
9. SEWERS TO BE LAID IN CLASS "S" BEDDING (150mm GRANULAR BED AND SURROUND). WHERE DEPTH OF COVER TO TOP OF THE SEWER IS LESS THAN 1.2m IN HIGHWAYS AND VERGES (OR LESS THAN 900mm IN NONE VEHICULAR ACCESS AREAS) THEN A CONCRETE SLAB SHOULD BE PROVIDED ABOVE GRANULAR BED AND SURROUND.
10. BEDDING AND BACKFILL MATERIAL TO CONFORM TO THE REQUIREMENT OF WATER INDUSTRY SPECIFICATION 4-08-02 (**TABLE A2**).
11. THE CHAMBER SIZE OF MANHOLES WITH MORE THAN ONE CONNECTION IN THEM MAY NEED TO BE INCREASED AN INCREMENT TO ACCOMMODATE THE CONNECTIONS AND BENDS.
12. YORKSHIRE WATER POLICY IS THAT TYPE "C" BRICK MANHOLES AND 1050mm DIA MANHOLE RINGS ARE NOT PREFERRED. INSTEAD IT IS PREFERRED THAT YOU USE A TYPE "B" MANHOLE WITH 1200mm DIA OR 1500mm DIA RINGS, WITH THE OPENING SITED OVER THE CHANNEL WHERE DEPTH OF COVER TO PIPE SOFFIT IS 1 - 1.5m.
13. ALL ADOPTABLE PLASTIC SEWER PIPES TO BE KITEMARKED (CERTIFIED TO WIS 4-35-01 AND BS/EN13476). ADOPTABLE PLASTIC SEWER PIPES TO BE LAID IN MAXIMUM 3 METRE LENGTHS UNLESS THERE IS A SPECIFIC OPERATIONAL NEED TO LAY LONGER LENGTHS. PLASTIC CHANNEL SECTIONS IN MANHOLES ARE NOT ACCEPTABLE AND YORKSHIRE WATER WOULD PREFER CLAYWARE CHANNEL IN MANHOLES. PLASTIC CHANNELS ARE DIFFICULT TO SET IN CONCRETE BECAUSE THEY FLOAT AND A SATISFACTORY FINISH CANNOT BE OBTAINED ON THE BENCHING.
14. THE MINIMUM CRUSHING STRENGTH FOR CLAY PIPES SHOULD BE AS FOLLOWS: 100mm DIA. 40kN/m, 150mm DIA 40kN/m, 225mm DIA 45kN/m AND 300mm DIA. 72kN/m. THE MINIMUM CRUSHING STRENGTH FOR CONCRETE PIPES SHOULD BE -(CLASS 120 TO EN 1916/BS5911-1 2002). PLASTIC PIPES SHOULD CONFORM TO WIS 4-35-01 AND BS EN13476.
15. WHERE A B125 COVER AND FRAME HAS BEEN APPROVED, THIS MUST NOT BE COATED IN PLASTIC AND MUST HAVE LIFTING EYES SUITABLY SIZED TO ACCOMMODATE STANDARD LIFTING KEYS. SCREW DOWN COVERS ARE NOT ACCEPTABLE.

OTHER DRAINAGE NOTES

16. ALL PRIVATE DRAINAGE WORKS SHALL BE CARRIED OUT IN ACCORDANCE WITH BUILDING REGULATIONS 2002 EDITION.
17. CONTRACTOR TO ESTABLISH POSITION SIZE AND DEPTH OF ALL EXISTING SEWERS AND SERVICES PRIOR TO COMMENCEMENT ON SITE.
18. THE CONTRACTOR SHALL ALLOW FOR THE PROTECTION, TEMPORARY AND PERMANENT SUPPORT, AND TEMPORARY AND PERMANENT DIVERSION WORKS, AS NECESSARY TO ALL EXISTING SERVICES.
19. THE CONTRACTOR SHALL ALLOW FOR ALL TRAFFIC MANAGEMENT IN CONNECTION WITH ROAD AND SEWER WORKS.
20. THE CONTRACTOR SHALL ALLOW FOR KEEPING SEWER TRENCHES AND EXCAVATIONS AS DRY AS PRACTICABLE BY PUMPING FROM TEMPORARY SUMPS AND DEWATERING AS APPROPRIATE. THE POINT AND METHOD OF DISCHARGE TO BE AGREED WITH THE DRAINAGE AUTHORITY.
21. FOR PIPE SPECIFICATION PLEASE REFER TO ADDITIONAL NOTES.
22. VITRIFIED CLAY PIPES AND FITTINGS SHALL COMPLY WITH THE RELEVANT PROVISIONS OF BS EN295 AND BS 65 RESPECTIVELY AND BE KITEMARKED. ALL PIPES SHALL BE EXTRA STRENGTH TO BS 65 OR EQUIVALENT BS EN295 PIPE CRUSHING STRENGTH.
23. PRECAST CONCRETE PRODUCTS SHALL COMPLY WITH THE RELEVANT PROVISIONS OF BS 5911 AND BE KITEMARKED. CONCRETE PIPES TO BE CLASS 120 UNLESS NOTED OTHERWISE.
24. GULLY GRATES AND FRAMES SHALL COMPLY WITH THE RELEVANT PROVISIONS OF BS EN124 AND BE OF A NON-ROCKING DESIGN WITH CAPTIVE HINGE ACCESS AND BE KITEMARKED. LOAD CLASS D400 FOR ROADS AND SERVICE YARD AREAS. CLASS C250 TO BE USED IN CAR PARKING AREAS.
25. BACKFILLING AND REINSTATEMENT TO TRENCHES IN PUBLIC HIGHWAYS SHALL BE IN ACCORDANCE WITH THE REQUIREMENTS AND SPECIFICATIONS OF THE ADOPTING AUTHORITY, OR, IN THE ABSENCE OF SUCH, IN ACCORDANCE WITH THE REQUIREMENTS OF "THE STREET WORKS REGULATIONS 1992" AND RELEVANT PROVISIONS OF H.A.U.C. "SPECIFICATION FOR THE REINSTATEMENT OF OPENINGS IN HIGHWAYS" JUNE 1992, BOTH UNDER SECTION 71 OF THE NEW ROADS AND STREET WORKS ACT 1991.
26. ALL TRADITIONAL RAINWATER PIPE DOWN COMERS TO DISCHARGE TO TRAPPED GULLIES.
27. ALL SIPHONIC DRAINAGE DOWN COMERS TO MANUFACTURER SPECIFICATION.
28. ALL ROAD GULLIES ARE TO BE TRAPPED GULLIES.
29. ALL GULLY LEADS TO BE 150mm DIAMETER.
30. ALL REDUNDANT EXISTING DRAINAGE TO BE GRUBBED UP OR GROUTED, ANY EXISTING LIVE DRAINAGE SHOULD BE REPORTED TO THE ENGINEER AND RECONNECTED.
31. ALL ROAD GULLIES & LEADS TO BE CLEARED OF DEBRIS UPON COMPLETION OF WORKS.
32. THE CONTRACTOR MUST ENSURE THAT ANY OF THE EXISTING DRAINAGE WHICH IS LIVE IS KEPT CLEAR OF DEBRIS AND SHOULD ALLOW FOR JETTING THROUGH THE NEW & EXISTING DRAINAGE UPON COMPLETION.
33. CONTRACTOR TO TAKE MEASURES TO PROTECT HIS OPERATIVES WITH RESPECT TO THE PRESENCE OF GAS IN SEWER TRENCHES AND MANHOLES THROUGH THE USE OF GAS MONITORING EQUIPMENT AND BREATHING APPARATUS AS REQUIRED.
34. CONTRACTOR TO APPLY FOR SEWER PERMITS AND ROAD OPENING PERMITS AS NECESSARY FROM THE APPROPRIATE AUTHORITIES, PRIOR TO COMMENCING WORKS.
35. WHERE PLASTIC PIPES ARE INSTALLED PRIOR TO GETTING APPROVAL THEN A LIGHT LINE CCTV SURVEY AND REPORT (ELECTRONIC DEFLECTION TESTING) OF THE PROSPECTIVELY ADOPTABLE SEWERS ARE REQUIRED PRIOR TO APPROVAL AT THE DEVELOPERS EXPENSE.
36. THERE SHOULD BE ENOUGH CLEARANCE TO ACCOMMODATE THE BEDDING FOR BOTH PIPES, APPROX. 300mm: IF CROSSOVER IS NEAR THE ROCKER THEN THE CLEARANCE NEEDED MAY BE INCREASED.

DRAINAGE SUMMARY:

SITE DEVELOPABLE AREA: 2.694 ha

SURFACE WATER

- SURFACE WATER TO DISCHARGE INTO EXISTING SURFACE WATER NETWORK DESIGNED DURING THE PREVIOUS PHASE, AS PART OF THE SITE-WIDE DEVELOPMENT
- FLOWS TO DISCHARGE AT AN UNRESTRICTED RATE INTO THE SITE-WIDE NETWORK

FOUL WATER

- FOUL TO DISCHARGE INTO AN EXISTING FOUL WATER TAIL PIPE DESIGNED DURING THE PREVIOUS PHASE, AS PART OF THE SITE-WIDE DEVELOPMENT

DESIGN NOTES:

1. ALL WORKS TO COMPLY WITH CURRENT VERSION OF THE FOLLOWING DOCUMENTS:
   - DESIGN MANUAL FOR ROADS AND BRIDGES (DMRB)
   - SPECIFICATION FOR HIGHWAY WORKS (SHW)
   - LOCAL AUTHORITY DESIGN GUIDE AND SPECIFICATION
2. PRIOR TO COMMENCING WORKS THE CONTRACTOR SHOULD INVESTIGATE AND LOCATE AS NECESSARY ANY STATUTORY UNDERTAKERS EQUIPMENT WITHIN THE NEW ACCESS AND DISCUSS REQUIREMENTS FOR LOWERING/DIVERSION AND PROTECTION WITH THE RELEVANT UNDERTAKER.
3. ALL WORKS WITHIN THE PUBLIC HIGHWAY TO MEET LOCAL AUTHORITY REQUIREMENTS. CONTRACTOR TO APPLY FOR ROAD OPENING NOTICES ETC AS REQUIRED.
4. CBR VALUE NOT AVAILABLE. ROAD CONSTRUCTION DETAIL SUBJECT TO CONFIRMATION OF CBR VALUES. CONTRACTOR TO ALLOW FOR LAB TESTS TO BE UNDERTAKEN IN AGREEMENT WITH LOCAL AUTHORITY HIGHWAY ENGINEER PRIOR TO WORKS COMMENCING.
5. PROPOSED LEVELS HAVE BEEN BASED ON THE AS BUILT EARTHWORKS TOPOGRAPHIC SURVEY PROVIDED **BY ELLAM SURVEYS BY DATED OCTOBER 2022**.
6. PROPOSED DRAINAGE BASED ON ARCHITECTURAL LAYOUT BY **THE HARRIS PARTNERSHIP ARCHITECTS RECEIVED JNOVEMBER 2022.**
7. SLOPES GREATER THAN 1 IN 3 MAY REQUIRE STABILISATION. GEOTECHNICAL ENGINEER TO BE CONTACTED TO CONFIRM REQUIREMENTS

DRAINAGE NOTES:

1. ALL PIPES 100Ø UNLESS OTHERWISE STATED.
2. ALL PRIVATE FOUL WATER PIPES NOT ANNOTATED TO BE A MINIMUM OF 100Ø INSTALLED AT 1:40; ALL PRIVATE SURFACE WATER PIPES NOT ANNOTATED TO BE A MINIMUM OF 100Ø INSTALLED AT 1:100.
3. ALL PPICs OVER 1.2m DEEP TO BE PROVIDED WITH REDUCED ACCESS COVER AND FRAME IN ACCORDANCE WITH BUILDING REGULATIONS PART H.
4. ALL PPICS IN TRAFFICKED AREAS TO HAVE D400 COVERS & CONCRETE SURROUND.
5. ALL INTERNAL PLOT DRAINAGE REQUIRES CONFIRMATION PRIOR TO CONSTRUCTION.
6. CONTRACTOR TO CONFIRM MH COVER & INVERT LEVEL OF PROPOSED CONNECTION POINT PRIOR TO CONSTRUCTION. ANY VARIATION TO BE REPORTED TO ENGINEER.
7. THE INVERT LEVEL OF THE EXISTING SEWERS ARE TO BE VERIFIED PRIOR TO COMMENCEMENT OF ANY DRAINAGE WORKS. ANY DISCREPANCY MUST BE NOTIFIED TO THE ENGINEER.
8. EXISTING MANHOLES TO BE MODIFIED TO ACCOMMODATE THE PROPOSED LATERAL CONNECTIONS. CONTRACTOR TO APPLY TO THE WATER AUTHORITY FOR THE SECTION 106 APPROVAL TO MAKE THE CONNECTIONS. PIPES ARE TO BE LAID WITH COMMON INVERT LEVELS.
9. ALL STUB PIPES ARE TO BE CAPPED.
10. ALL PIPES CONNECTIONS TO BE SOFFIT TO SOFFIT UNLESS STATED OTHERWISE. REFER TO MANHOLE SCHEDULE FOR FURTHER INFORMATION.
11. FLOOD DEFENSE WORKS APPLICATION OR EQUIVALENT TO BE MADE TO THE LOCAL AUTHORITY PRIOR TO CARRYING OUT ANY WORKS TO THE EXISTING WATERCOURSE.

PIPE MATERIALS

- **150-225Ø: CLAY PIPES TO BE BSI KITEMARKED AND CERTIFIED TO BS 295-1 & BS65.**
- **300-825Ø: CONCRETE PIPES TO BE BSI KITEMARKED, CLASS 120 CONCRETE & CERTIFIED TO BS5911 & 1916.**

KEY

FLOOD ROUTE DIRECTIONS BASED UPON ANY POTENTIAL BLOCKAGES WITHIN THE SURFACE WATER DRAINAGE SYSTEM AND/OR ANY FLOODING AS IDENTIFIED WITHIN THE DRAINAGE MODELLING AT 100YR+40% CC EVENT

SUBJECT TO APPROVAL BY THE LOCAL AUTHORITY

Date	Revisions	Drawn	Checked	Rev
17.11.2022	FIRST ISSUE	VW	AMF	1

Dwg Status: PRELIMINARY

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Client: HARWORTH GROUP

Project: GATEWAY 36, BIRDWELL UNIT 4 (PLOT 8)

Title: DRAINAGE LAYOUT PLAN SHEET 2 OF 2

DO NOT SCALE	Scale @ A0: 1:250	Drawn VW	Checked AMF	Date 16.11.2022
Job No Y22039		Dwg No D200		Rev 1

GENERAL SAFETY NOTES:

1. WHERE THE BASE (ROAD BASE) HAS BEEN USED AS A TEMPORARY RUNNING SURFACE DURING THE CONTRACT IT SHALL BE THOROUGHLY CLEANED AND POWER WASHED AS NECESSARY. AFTER DRYING AND IMMEDIATELY BEFORE THE BINDER COURSE IS LAID A TACK COAT OF BITUMEN EMULSION CLASS A1-40 OR K1-40 TO BS434 SHALL BE APPLIED AT A RATE OF 0.35-0.55 LITRES/SQ METER.
2. ALL RADIUS KERBS WITH A RADIUS OF 12m OR LESS SHALL BE FORMED WITH PROPRIETARY RADIUS KERBS.

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ROADS & DRAINAGE

2. CONTRACTOR TO PROVIDE TRENCH SUPPORTS AS APPROPRIATE AND ENSURE THAT PLANT REMAINS A SAFE DISTANCE FROM TRENCHES PRIOR TO INSTALLING DRAINAGE
3. THE TIME THAT EXCAVATIONS ARE OPEN ON SITE SHOULD BE KEPT TO A MINIMUM AND ALL TRENCHES SHOULD BE SURROUNDED BY A BARRIER.
4. CONNECTIONS TO EXISTING SEWERS TO BE MADE BY APPROVED CONTRACTOR ONLY.
5. CONTRACTOR TO MAKE OPERATIVES AWARE OF ASSOCIATED DANGERS TO HEALTH SUCH AS LEPTOSPIROSIS (WELS DISEASE) AND RECOMMENDED PRECAUTIONS. ADEQUATE WELFARE FACILITIES AND PROTECTIVE CLOTHING TO BE PROVIDED AS REQUIRED.
6. UNFINISHED MANHOLES MUST BE COVERED WITH LOAD BEARING MATERIALS AND SURROUNDED WITH BARRIER.

PIPES & CABLES

7. CONTRACTOR TO OBTAIN ALL SERVICE RECORDS PRIOR TO WORKS COMMENCING.
8. SERVICE RECORDS TO BE REFERRED TO PRIOR TO WORK COMMENCING. CONTRACTOR TO PROCEED WITH CAUTION AND SERVICES TO BE LOCATED BY HAND DIG AND PROTECTED ACCORDINGLY.

EXCAVATION/FILL

9. CONTRACTOR TO ENSURE RELEVANT MEASURES ARE TAKEN TO KEEP PLANT AND PEOPLE A SAFE DISTANCE FROM STEEP SLOPES DURING THE WORKS.
10. CONTRACTOR TO ENSURE THAT PROCEDURES ARE IN PLACE TO KEEP PEOPLE A SAFE DISTANCE FROM WORKING PLANT WHERE NECESSARY.
11. CONTRACTOR TO REFER TO GROUND INVESTIGATION REPORT FOR CONTAMINATION TESTS AND TO PROVIDE ADEQUATE WELFARE FACILITIES AND PROTECTIVE CLOTHING AS REQUIRED.

DRAINAGE SPECIFICATIONS FOR YORKSHIRE WATER

1. ALL ADOPTABLE SEWER WORKS AND MATERIALS TO BE IN ACCORDANCE WITH "CODE FOR ADOPTION". THE RELEVANT BRITISH/EUROPEAN AND YORKSHIRE WATER'S STANDARDS/REQUIREMENTS/ADDENDUM TO THE MECHANICAL AND ELECTRICAL SPECIFICATION AND KITEMARKED.
2. MANHOLE COVERS SHALL/MUST HAVE A CLEAR OPENING OF 600mm AND SHALL BE CLASS D400 TO BS EN 124 WITH 150mm DEEP FRAMES IN HIGHWAYS.
3. FILLED GROUND MUST BE FILLED AND CONSOLIDATED UNDER THE SUPERVISION AND TO THE SATISFACTION OF YORKSHIRE WATER BEFORE ANY SEWER WORKS ARE CARRIED OUT.
4. YORKSHIRE WATER IS NOT OBLIGED TO ACCEPT FILTER DRAIN/LAND DRAINAGE RUN-OFF INTO THE PUBLIC SEWER NETWORK OR ADOPTABLE DRAINAGE SYSTEM (**DIRECTLY OR IN-DIRECTLY**). AN ALTERNATIVE METHOD OF DISPOSAL OF THE LAND DRAINAGE RUN-OFF WILL THEREFORE BE REQUIRED AND YOU WILL HAVE TO LIAISE WITH THE LOCAL AUTHORITY, LAND DRAINAGE SECTION WITH REGARD TO THE DISPOSAL OF THE FILTER DRAIN/LAND DRAINAGE RUN-OFF.
5. COVER SLABS MUST CARRY THE BSI KITEMARK OR WILL BE REJECTED BY YORKSHIRE WATER INSPECTOR WHERE THE CLEAR OPENING OF THE KITEMARKED PRODUCT IS DIFFERENT TO THAT OF THE COVER AND FRAME. A LOADING BEARING SLAB SHOULD BE FITTED ABOVE THE COVER SLAB TO BRING THE SIZE DOWN TO 600mm X 600mm FOR THE YORKSHIRE WATER SPECIFIED COVER SIZE. PLEASE REFER TO CONCRETE PIPE SYSTEMS ASSOCIATION (**CPSA**), TECHNICAL BULLETIN ISSUED AUTUMN 2004 FOR KITEMARKED COVER SLAB OPENING SIZES.
6. SULPHATE RESISTANT CEMENT (**C30-DC2**) AND PRECAST CONCRETE PRODUCTS MUST BE USED OR A LABORATORY REPORT PROVIDED PROVING THAT SUCH PRECAUTIONS ARE NOT NECESSARY.
7. THE ADOPTABLE SEWERS SHOULD BE A MINIMUM OF 1m AND MANHOLES 0.5m FROM KERB FACES AND SERVICE MARGINS.
8. SEWERS MUST HAVE 5 METRES CLEARANCE FROM TREES AND HEDGES OR THE WIDTH OF THE CANOPY AT MATURE HEIGHT.
9. SEWERS TO BE LAID IN CLASS 'S' BEDDING (150mm GRANULAR BED AND SURROUND) WHERE DEPTH OF COVER TO TOP OF THE SEWER IS LESS THAN 1.2m IN HIGHWAYS AND VERGES (OR LESS THAN 900mm IN NONE VEHICULAR ACCESS AREAS) THEN A CONCRETE SLAB SHOULD BE PROVIDED ABOVE GRANULAR BED AND SURROUND.
10. BEDDING AND BACKFILL MATERIAL TO CONFORM TO THE REQUIREMENT OF WATER INDUSTRY SPECIFICATION 4-08-02 (**TABLE A2**).
11. THE CHAMBER SIZE OF MANHOLES WITH MORE THAN ONE CONNECTION IN THEM MAY NEED TO BE INCREASED AN INCREMENT TO ACCOMMODATE THE CONNECTIONS AND BENDS.
12. YORKSHIRE WATER POLICY IS THAT TYPE "C" BRICK MANHOLES AND 1050mm DIA MANHOLE RINGS ARE NOT PREFERRED. INSTEAD IT IS PREFERRED THAT YOU USE A TYPE "B" MANHOLE WITH 1200mm DIA OR 1500mm DIA RINGS, WITH THE OPENING SITED OVER THE CHANNEL WHERE DEPTH OF COVER TO PIPE SOFFIT IS 1 - 1.5m.
13. ALL ADOPTABLE PLASTIC SEWER PIPES TO BE KITEMARKED (CERTIFIED TO WIS 4-35-01 AND BS/EN13476). ADOPTABLE PLASTIC SEWER PIPES TO BE LAID IN MAXIMUM 3 METRE LENGTHS UNLESS THERE IS A SPECIFIC OPERATIONAL NEED TO LAY LONGER LENGTHS. PLASTIC CHANNEL SECTIONS IN MANHOLES ARE NOT ACCEPTABLE AND YORKSHIRE WATER WOULD PREFER CLAY/WARE CHANNEL IN MANHOLES. PLASTIC CHANNELS ARE DIFFICULT TO SET IN CONCRETE BECAUSE THEY FLOAT AND A SATISFACTORY FINISH CANNOT BE OBTAINED ON THE BENCHING.
14. THE MINIMUM CRUSHING STRENGTH FOR CLAY PIPES SHOULD BE AS FOLLOWS: 100mm DIA. 40kN/m, 150mm DIA 40kN/m, 225mm DIA 45kN/m AND 300mm DIA. 72kN/m. THE MINIMUM CRUSHING STRENGTH FOR CONCRETE PIPES SHOULD BE - (CLASS 120 TO EN 1916/BS5911-1 2002). PLASTIC PIPES SHOULD CONFORM TO WIS 4-35-01 AND BS EN13476.
15. WHERE A B125 COVER AND FRAME HAS BEEN APPROVED, THIS MUST NOT BE COATED IN PLASTIC AND MUST HAVE LIFTING EYES SUITABLY SIZED TO ACCOMMODATE STANDARD LIFTING KEYS. SCREW DOWN COVERS ARE NOT ACCEPTABLE.

OTHER DRAINAGE NOTES

16. ALL PRIVATE DRAINAGE WORKS SHALL BE CARRIED OUT IN ACCORDANCE WITH BUILDING REGULATIONS 2002 EDITION.
17. CONTRACTOR TO ESTABLISH POSITION SIZE AND DEPTH OF ALL EXISTING SEWERS AND SERVICES PRIOR TO COMMENCEMENT ON SITE.
18. THE CONTRACTOR SHALL ALLOW FOR THE PROTECTION, TEMPORARY AND PERMANENT SUPPORT, AND TEMPORARY AND PERMANENT DIVERSION WORKS, AS NECESSARY TO ALL EXISTING SERVICES.
19. THE CONTRACTOR SHALL ALLOW FOR ALL TRAFFIC MANAGEMENT IN CONNECTION WITH ROAD AND SEWER WORKS.
20. THE CONTRACTOR SHALL ALLOW FOR KEEPING SEWER TRENCHES AND EXCAVATIONS AS DRY AS PRACTICABLE BY PUMPING FROM TEMPORARY SUMPS AND DEWATERING AS APPROPRIATE. THE POINT AND METHOD OF DISCHARGE TO BE AGREED WITH THE DRAINAGE AUTHORITY.
21. FOR PIPE SPECIFICATION PLEASE REFER TO ADDITIONAL NOTES.
22. VITRIFIED CLAY PIPES AND FITTINGS SHALL COMPLY WITH THE RELEVANT PROVISIONS OF BS EN295 AND BS 65 RESPECTIVELY AND BE KITEMARKED. ALL PIPES SHALL BE EXTRA STRENGTH TO BS 65 OR EQUIVALENT BS EN295 PIPE CRUSHING STRENGTH.
23. PRECAST CONCRETE PRODUCTS SHALL COMPLY WITH THE RELEVANT PROVISIONS OF BS 5911 AND BE KITEMARKED. CONCRETE PIPES TO BE CLASS 120 UNLESS NOTED OTHERWISE.
24. GULLY GRATES AND FRAMES SHALL COMPLY WITH THE RELEVANT PROVISIONS OF BS EN124 AND BE OF A NON-ROCKING DESIGN WITH CAPTIVE HINGE ACCESS AND BE KITEMARKED. LOAD CLASS D400 FOR ROADS AND SERVICE YARD AREAS. CLASS C250 TO BE USED IN CAR PARKING AREAS.
25. BACKFILLING AND REINSTATEMENT TO TRENCHES IN PUBLIC HIGHWAYS SHALL BE IN ACCORDANCE WITH THE REQUIREMENTS AND SPECIFICATIONS OF THE ADOPTING AUTHORITY, OR, IN THE ABSENCE OF SUCH, IN ACCORDANCE WITH THE REQUIREMENTS OF "THE STREET WORKS REGULATIONS 1992" AND RELEVANT PROVISIONS OF H.A.U.C. "SPECIFICATION FOR THE REINSTATEMENT OF OPENINGS IN HIGHWAYS" JUNE 1992, BOTH UNDER SECTION 71 OF THE NEW ROADS AND STREET WORKS ACT 1991.
26. ALL TRADITIONAL RAINWATER PIPE DOWN COMERS TO DISCHARGE TO TRAPPED GULLIES.
27. ALL SIPHONIC DRAINAGE DOWN COMERS TO MANUFACTURER SPECIFICATION.
28. ALL ROAD GULLIES ARE TO BE TRAPPED GULLIES.
29. ALL GULLY LEADS TO BE 150mm DIAMETER.
30. ALL REDUNDANT EXISTING DRAINAGE TO BE GRUBBED UP OR GROUTED, ANY EXISTING LIVE DRAINAGE SHOULD BE REPORTED TO THE ENGINEER AND RECONNECTED.
31. ALL ROAD GULLIES & LEADS TO BE CLEARED OF DEBRIS UPON COMPLETION OF WORKS.
32. THE CONTRACTOR MUST ENSURE THAT ANY OF THE EXISTING DRAINAGE WHICH IS LIVE IS KEPT CLEAR OF DEBRIS AND SHOULD ALLOW FOR JETTING THROUGH THE NEW & EXISTING DRAINAGE UPON COMPLETION.
33. CONTRACTOR TO TAKE MEASURES TO PROTECT HIS OPERATIVES WITH RESPECT TO THE PRESENCE OF GAS IN SEWER TRENCHES AND MANHOLES THROUGH THE USE OF GAS MONITORING EQUIPMENT AND BREATHING APPARATUS AS REQUIRED.
34. CONTRACTOR TO APPLY FOR SEWER PERMITS AND ROAD OPENING PERMITS AS NECESSARY FROM THE APPROPRIATE AUTHORITIES, PRIOR TO COMMENCING WORKS.
35. WHERE PLASTIC PIPES ARE INSTALLED PRIOR TO GETTING APPROVAL THEN A LIGHT LINE CCTV SURVEY AND REPORT (ELECTRONIC DEFLECTION TESTING) OF THE PROSPECTIVELY ADOPTABLE SEWERS ARE REQUIRED PRIOR TO APPROVAL AT THE DEVELOPERS EXPENSE.
36. THERE SHOULD BE ENOUGH CLEARANCE TO ACCOMMODATE THE BEDDING FOR BOTH PIPES, APPROX. 300mm: IF CROSSOVER IS NEAR THE ROCKER THEN THE CLEARANCE NEEDED MAY BE INCREASED.

DRAINAGE SUMMARY:
SITE DEVELOPABLE AREA: 2.694 ha

SURFACE WATER

- SURFACE WATER TO DISCHARGE INTO EXISTING SURFACE WATER NETWORK DESIGNED DURING THE PREVIOUS PHASE, AS PART OF THE SITE-WIDE DEVELOPMENT
- FLOWS TO DISCHARGE AT AN UNRESTRICTED RATE INTO THE SITE-WIDE NETWORK

FOUL WATER

- FOUL TO DISCHARGE INTO AN EXISTING FOUL WATER TAIL PIPE DESIGNED DURING THE PREVIOUS PHASE, AS PART OF THE SITE-WIDE DEVELOPMENT

DESIGN NOTES:

1. ALL WORKS TO COMPLY WITH CURRENT VERSION OF THE FOLLOWING DOCUMENTS:
   - DESIGN MANUAL FOR ROADS AND BRIDGES (DMRB)
   - SPECIFICATION FOR HIGHWAY WORKS (SHW)
   - LOCAL AUTHORITY DESIGN GUIDE AND SPECIFICATION
2. PRIOR TO COMMENCING WORKS THE CONTRACTOR SHOULD INVESTIGATE AND LOCATE AS NECESSARY ANY STATUTORY UNDERTAKERS EQUIPMENT WITHIN THE NEW ACCESS AND DISCUSS REQUIREMENTS FOR LOWERING/DIVERSION AND PROTECTION WITH THE RELEVANT UNDERTAKER.
3. ALL WORKS WITHIN THE PUBLIC HIGHWAY TO MEET LOCAL AUTHORITY REQUIREMENTS. CONTRACTOR TO APPLY FOR ROAD OPENING NOTICES ETC AS REQUIRED.
4. CBR VALUE NOT AVAILABLE. ROAD CONSTRUCTION DETAIL SUBJECT TO CONFIRMATION OF CBR VALUES. CONTRACTOR TO ALLOW FOR LAB TESTS TO BE UNDERTAKEN IN AGREEMENT WITH LOCAL AUTHORITY HIGHWAY ENGINEER PRIOR TO WORKS COMMENCING.
5. PROPOSED LEVELS HAVE BEEN BASED ON THE AS BUILT EARTHWORKS TOPOGRAPHIC SURVEY PROVIDED **BY ELLAM SURVEYS BY DATED OCTOBER 2022**.
6. PROPOSED DRAWING BASED ON ARCHITECTURAL LAYOUT BY **THE HARRIS PARTNERSHIP ARCHITECTS RECEIVED NOVEMBER 2022.**
7. SLOPES GREATER THAN 1 IN 3 MAY REQUIRE STABILISATION. GEOTECHNICAL ENGINEER TO BE CONTACTED TO CONFIRM REQUIREMENTS

DRAINAGE NOTES:

1. ALL PIPES 100Ø UNLESS OTHERWISE STATED.
2. ALL PRIVATE FOUL WATER PIPES NOT ANNOTATED TO BE A MINIMUM OF 100Ø INSTALLED AT 1:40; ALL PRIVATE SURFACE WATER PIPES NOT ANNOTATED TO BE A MINIMUM OF 100Ø INSTALLED AT 1:100.
3. ALL PPICs OVER 1.2m DEEP TO BE PROVIDED WITH REDUCED ACCESS COVER AND FRAME IN ACCORDANCE WITH BUILDING REGULATIONS PART H.
4. ALL PPICS IN TRAFFICKED AREAS TO HAVE D400 COVERS & CONCRETE SURROUND.
5. ALL INTERNAL PLOT DRAINAGE REQUIRES CONFIRMATION PRIOR TO CONSTRUCTION.
6. CONTRACTOR TO CONFIRM MH COVER & INVERT LEVEL OF PROPOSED CONNECTION POINT PRIOR TO CONSTRUCTION. ANY VARIATION TO BE REPORTED TO ENGINEER.
7. THE INVERT LEVEL OF THE EXISTING SEWERS ARE TO BE VERIFIED PRIOR TO COMMENCEMENT OF ANY DRAINAGE WORKS. ANY DISCREPANCY MUST BE NOTIFIED TO THE ENGINEER.
8. EXISTING MANHOLES TO BE MODIFIED TO ACCOMMODATE THE PROPOSED LATERAL CONNECTIONS. CONTRACTOR TO APPLY TO THE WATER AUTHORITY FOR THE SECTION 106 APPROVAL TO MAKE THE CONNECTIONS. PIPES ARE TO BE LAID WITH COMMON INVERT LEVELS.
9. ALL STUB PIPES ARE TO BE CAPPED.
10. ALL PIPES CONNECTIONS TO BE SOFFIT TO SOFFIT UNLESS STATED OTHERWISE. REFER TO MANHOLE SCHEDULE FOR FURTHER INFORMATION.
11. FLOOD DEFENSE WORKS APPLICATION OR EQUIVALENT TO BE MADE TO THE LOCAL AUTHORITY PRIOR TO CARRYING OUT ANY WORKS TO THE EXISTING WATERCOURSE.

PIPE MATERIALS

- **150-225Ø: CLAY PIPES TO BE BSI KITEMARKED AND CERTIFIED TO BS 295-1 & BS65.**
- **300-825Ø: CONCRETE PIPES TO BE BSI KITEMARKED, CLASS 120 CONCRETE & CERTIFIED TO BS5911 & 1916.**

KEY

- SITE BOUNDARY
- MAJOR CONTOUR
- MINOR CONTOUR
- EXSWMH CL 0.000 IL 0.000 — EX. 300Ø → — EXISTING SURFACE WATER
- EXFWMH CL 0.000 IL 0.000 — EX. 300Ø → — EXISTING FOUL WATER
- 1500 1:150 → — PROPOSED PRIVATE SURFACE WATER
- SWMH CL 0.000 IL 0.000 — PROPOSED PRIVATE SURFACE WATER MANHOLE
- SWIC CL 0.000 IL 0.000 — PROPOSED PRIVATE SURFACE WATER PPIC
- PROPOSED PRIVATE SURFACE WATER CHAMBER (300Ø)
- RWP — PROPOSED SIPHONIC RAINWATER PIPE
- DC — PROPOSED DRAINAGE CHANNEL
- PROPOSED PRIVATE GULLY
- PROPOSED OIL INTERCEPTOR
- 1500 1:150 → — PROPOSED PRIVATE FOUL WATER
- FWMH CL 0.000 IL 0.000 — PROPOSED PRIVATE FOUL WATER MANHOLE
- FWIC CL 0.000 IL 0.000 — PROPOSED PRIVATE FOUL WATER PPIC
- SVP/SFG/SP/BIG — PROPOSED SVP/SFG/SP/BIG

SUBJECT TO APPROVAL BY THE LOCAL AUTHORITY

Date	Revisions	Drawn	Checked	Rev
17.11.2022	FIRST ISSUE	VW	AMF	1

Dwg Status: PRELIMINARY

NORTH EAST
0191 2585632

YORKSHIRE
0113 5323500

RWO
CONSULTING ENGINEERS
WWW.RWO.GROUP
INFO@RWO.GROUP

Client: HARWORTH GROUP

Project: GATEWAY 36, BIRDWELL
UNIT 4 (PLOT 8)

Title: DRAINAGE LAYOUT PLAN
SHEET 2 OF 2

DO NOT SCALE	Scale @ A0: 1:250	Drawn VW	Checked AMF	Date 17.11.2022
Job No Y22039		Dwg No D201		Rev 1

Appendix B Site Infrastructure Drainage Layout Drawings

SEE DRAWING D201 FOR CONTINUATION OF PLAN

ALL DRAINAGE CHANNELS TO BE PROVIDED WITH ACCESS POINT AT ENDS OF CHANNELS TO ALLOW RODDING/JETTING (TYPICAL TO ALL CHANNELS)

150mm CONCRETE BED & SURROUND TO PIPES SHADED THUS

DC - HAURATON RECYFIX MONOTEC 100

SIPHONIC ROOF DRAINAGE SUPPLIER TO TAKE CONNECTIONS TO FIRST MANHOLE (TYPICAL TO ALL UNITS)

SIPHONIC VENT GULLY CONNECTED AT HIGH LEVEL TO MANHOLE

CLASS 1 FULL RETENTION INTERCEPTOR (DRAINAGE CATCHMENT AREA 4240m²) CL=147.110 KLARGESTER REF: NSFA080

STORMSAVER RAINWATER HARVESTING TANK CATCHMENT AREA = 840m² INSTALLED IN ACCORDANCE WITH MANUFACTURERS INSTRUCTIONS

FW6 CL 147.120 IL 144.210

1.004 1500 L 89.64 66Nw VC

1.004 1500 L 44.80 60Sw DSN

SW8 CL 146.932 IL 144.450

2250 PERFORATED LAND DRAIN

CATCH PIT CL 147.529 IL 146.870

DRAINAGE TAIL FOR FUTURE DEVELOPMENT IL = 147.040 E426812.190, N401077.129

ALL DRAINAGE CHANNELS TO BE PROVIDED WITH ACCESS POINT AT ENDS OF CHANNELS TO ALLOW RODDING/JETTING (TYPICAL TO ALL CHANNELS)

150mm CONCRETE BED & SURROUND TO PIPES SHADED THUS

CLASS 1 FULL RETENTION INTERCEPTOR (DRAINAGE CATCHMENT AREA 3075m²) CL=147.170 KLARGESTER REF: NSFA065

STORMSAVER RAINWATER HARVESTING TANK CATCHMENT AREA = 1090m² INSTALLED IN ACCORDANCE WITH MANUFACTURERS INSTRUCTIONS

SRWP

PSW14 CL 147.535 IL 145.800

1.003 1500 L 154.44 62Nw VC

FW4 CL 147.529 IL 144.500

SW9 CL 147.645 IL 144.710

1.003 4000 T 172.08 83Sw DSN

1.002 1500 L 139.68 81Nw VC

FW3 CL 148.150 IL 145.010

CL 148.291 IL 145.190

1.001 1500 L 120.41 90Nw VC

1.002 4000 T 115.00 39Sw DSN

CATCH PIT CL 148.350 IL 147.630

1500 PERFORATED LAND DRAIN

FW4 CL 148.534 IL 146.350 IL 146.050

1.000 1500 L 108.28 04Nw VC

FW1 CL 148.645 IL 146.210

CL 148.730 IL 146.360

DRAINAGE TAIL FOR FUTURE DEVELOPMENT IL = 146.830 E426829.325, N401147.286 ALL DRAIN TAILS PROVIDED WITH A PROPRIETARY SEALED CAP (TYPICAL)

CATCH PIT CL 148.750 IL 147.920

1500 PERFORATED LAND DRAIN

LAND DRAIN IL 148.000 E426917.752 , N401174.991

PROVIDE 150mm CONCRETE BED & SURROUND TO DRAINS WHERE COVER TO SOFFIT IS LESS THAN 0.90m (HATCHED THUS)

PSW2 CL 148.144 IL 146.390

CLASS 1 FULL RETENTION INTERCEPTOR (DRAINAGE CATCHMENT AREA c.2645m²) CL=148.280 KLARGESTER REF: NSFA050

PSW6 CL 147.807 IL 146.057

PSW5 CL 147.883 IL 146.133

CL 147.880 IL 146.080

SW1 CL 148.186 IL 146.280

STORMSAVER RAINWATER HARVESTING TANK CATCHMENT AREA = 1960m² INSTALLED IN ACCORDANCE WITH MANUFACTURERS INSTRUCTIONS

HEALTH & SAFETY:

1. CONTRACTOR SHOULD BE AWARE OF GENERAL CONSTRUCTION RISKS TO PREVENT SLIPS, TRIPS AND FALLS AND TAKE NECESSARY PRECAUTIONS WITHOUT SPECIAL INSTRUCTION.

ROADS & DRAINAGE

2. CONTRACTOR TO PROVIDE TRENCH SUPPORTS AS APPROPRIATE AND ENSURE THAT PLANT REMAINS A SAFE DISTANCE FROM TRENCHES PRIOR TO INSTALLING DRAINAGE.
3. THE TIME THAT EXCAVATIONS ARE OPEN ON SITE SHOULD BE KEPT TO A MINIMUM AND ALL TRENCHES SHOULD BE SURROUNDED BY A BARRIER.
4. CONNECTIONS TO EXISTING SEWERS TO BE MADE BY APPROVED CONTRACTOR ONLY.
5. CONTRACTOR TO MAKE OPERATIVES AWARE OF ASSOCIATED DANGERS TO HEALTH SUCH AS LEPTOSPIROSIS (WEILS DISEASE) AND RECOMMENDED PRECAUTIONS. ADEQUATE WELFARE FACILITIES AND PROTECTIVE CLOTHING TO BE PROVIDED AS REQUIRED.
6. UNFINISHED MANHOLES MUST BE COVERED WITH LOAD BEARING MATERIALS AND SURROUNDED WITH BARRIER.

PIPES & CABLES

7. CONTRACTOR TO OBTAIN ALL SERVICE RECORDS PRIOR TO WORKS COMMENCING.
8. SERVICE RECORDS TO BE REFERRED TO PRIOR TO WORKS COMMENCING. CONTRACTOR TO PROCEED WITH CAUTION AND SERVICES TO BE LOCATED BY HAND DIG AND PROTECTED ACCORDINGLY.

EXCAVATION/FILL

9. CONTRACTOR TO ENSURE RELEVANT MEASURES ARE TAKEN TO KEEP PLANT AND PEOPLE A SAFE DISTANCE FROM STEEP SLOPES DURING THE WORKS.
10. CONTRACTOR TO ENSURE THAT PROCEDURES ARE IN PLACE TO KEEP PEOPLE A SAFE DISTANCE FROM WORKING PLANT WHERE NECESSARY
11. CONTRACTOR TO REFER TO GROUND INVESTIGATION REPORT FOR CONTAMINATION TESTS AND TO PROVIDE ADEQUATE WELFARE FACILITIES AND PROTECTIVE CLOTHING AS REQUIRED.

SEWER NOTES

- ALL SEWERS TO BE BSI KITEMARK **(CERTIFIED TO WIS 4-35-01)**
- SEWER PIPES TO BE LAID IN MAXIMUM 3 METRE LENGTHS UNLESS THERE IS A SPECIFIC OPERATIONAL NEED TO LAY LONGER LENGTHS
- PLASTIC CHANNEL SECTIONS IN MANHOLES ARE NOT ACCEPTABLE AND CLAYWARE CHANNEL SHALL BE USED. PLASTIC CHANNELS ARE DIFFICULT TO SET IN CONCRETE BECAUSE THEY FLOAT AND A SATISFACTORY FINISH CANNOT BE OBTAINED ON THE BENCHING.

DRAINAGE SPECIFICATIONS FOR YORKSHIRE WATER

1. ALL SEWER WORKS AND MATERIALS TO BE IN ACCORDANCE WITH THE 'DESIGN AND CONSTRUCTION GUIDANCE UNDER THE CODE FOR ADOPTION AGREEMENTS': THE RELEVANT BRITISH/EUROPEAN AND YORKSHIRE WATER'S STANDARDS/REQUIREMENTS/ADDENDUM TO THE MECHANICAL AND ELECTRICAL SPECIFICATION AND AITEMWARDS.
2. MANHOLE COVERS SHALL/MUST HAVE A CLEAR OPENING OF 600mm AND SHALL BE CLASS D400 TO BS EN 124 WITH 150mm DEEP FRAMES IN HIGHWAYS.
3. FILLED GROUND MUST BE FILLED AND CONSOLIDATED UNDER THE SUPERVISION AND TO THE SATISFACTION OF YORKSHIRE WATER BEFORE ANY SEWER WORKS ARE CARRIED OUT
4. COVER SLABS MUST CARRY THE SW KITEMARK OR WILL BE REJECTED BY YORKSHIRE WATER INSPECTOR. THE SW MARK IS THE ONLY MARK ACCEPTABLE AND IS CONSIDERED EQUIVALENT TO THAT OF THE COVER AND FRAME. A LOADING BEARING SLAB SHOULD BE FITTED ABOVE THE COVER SLAB TO BRING THE SIZE DOWN TO 600mm X 600mm FOR THE YORKSHIRE WATER SPECIFIED COVER SIZE. PLEASE REFER TO CONCRETE PIPE SYSTEMS ASSOCIATION (CPSA), TECHNICAL BULLETIN ISSUED AUTUMN 2004 FOR KITEMARKED COVER SLAB OPENING SIZES.
5. SULPHATE RESISTANT CEMENT (CDO/CO) AND PRECAST CONCRETE PRODUCTS MUST BE USED OR A LABORATORY REPORT PROVIDED PROVING THAT SUCH PRECAUTIONS ARE NOT NECESSARY.
6. THE ADOPTABLE SEWERS SHOULD BE A MINIMUM OF 1m AND MANHOLES 0.5m FROM KERB FACES AND SERVICE MARGINS.
7. 'SEWERS MUST HAVE 5 METRES CLEARANCE FROM TREES AND HEDGES (PLEASE ALSO REFER TO FIGURE 2.3 ON PAGE 33 IN 'SEWERS FOR ADOPTION' 6TH EDITION FOR RESTRICTIONS ON TREE PLANTING ADJACENT TO SEWERS)'.
8. SEWERS TO BE LAID IN CLASS 'S' BEDDING (150mm GRANULAR BED AND SURROUND). WHERE DEPTH OF COVER TO TOP OF THE SEWER IS LESS THAN 1.2m IN HIGHWAYS AND VERGES OR LESS THAN 900mm IN NONE VEHICULAR ACCESS AREAS) THEN A CONCRETE SLAB SHOULD BE PROVIDE ABOVE GRANULAR BED AND SURROUND.
9. BACKFILLING MATERIAL TO CONFORM TO THE REQUIREMENT OF WATER INDUSTRY SPECIFICATION 4-08-02 (TABLE A2).
10. THE CHAMBER SIZE OF MANHOLES WITH MORE THAN ONE CONNECTION THEN MAY NEED TO BE INCREASED AN INCREMENT TO ACCOMMODATE THE CONNECTIONS AND BENDS.
11. ALL PLASTIC SEWER PIPES TO BE KITEMARKED (CERTIFIED TO WIS 4-24-01 AND BSEN13476). PLASTIC SEWER PIPES TO BE LAID IN MAXIMUM 3 METRE LENGTHS UNLESS THERE IS A SPECIFIC OPERATIONAL NEED TO LAY LONGER LENGTHS.
12. WHERE A B126 COVER AND FRAME HAS BEEN APPROVED, THIS MUST NOT BE COATED IN PLASTIC AND MUST HAVE LIFTING EYES SUITABLY SIZED TO ACCOMMODATE STANDARD LIFTING KEYS. SCREW DOWN COVERS ARE NOT ACCEPTABLE.

OTHER DRAINAGE NOTES

13. ALL PRIVATE DRAINAGE WORKS SHALL BE CARRIED OUT IN ACCORDANCE WITH BUILDING REGULATIONS 2000 EDITION.
14. CONTRACTOR TO ESTABLISH POSITION SIZE AND DEPTH OF ALL EXISTING SEWERS AND SERVICES PRIOR TO COMMENCEMENT ON SITE.
15. THE CONTRACTOR SHALL ALLOW FOR THE PROTECTION, TEMPORARY AND PERMANENT SUPPORT, AND TEMPORARY AND PERMANENT DIVERSION WORKS, AS NECESSARY TO ALL EXISTING SERVICES.
16. THE CONTRACTOR SHALL ALLOW FOR ALL TRAFFIC MANAGEMENT IN CONNECTION WITH ROAD AND SEWER WORKS.
17. THE CONTRACTOR SHALL ALLOW FOR KEEPING SEWER TRENCHES AND EXCAVATIONS AS DRY AS PRACTICABLE BY PUMPING FROM TEMPORARY SUMPS AND DEWATERING AS APPROPRIATE, THE POINT AND METHOD OF DISCHARGE TO BE AGREED WITH THE DRAINAGE AUTHORITY.
18. FOR PIPE SPECIFICATION PLEASE REFER TO ADDITIONAL NOTES.
19. VITRIFIED CLAY PIPES AND FITTINGS SHALL COMPLY WITH THE RELEVANT PROVISIONS OF BS EN295 AND BS 65 RESPECTIVELY AND BE KITEMARKED. ALL PIPES SHALL BE EXTRA STRENGTH TO BS 65 OR EQUIVALENT BS EN295 PIPE CRUSHING STRENGTH.
20. PRECAST CONCRETE PRODUCTS SHALL COMPLY WITH THE RELEVANT PROVISIONS OF BS 5911 AND BE KITEMARKED. CONCRETE PIPES TO BE CLASS 120 UNLESS NOTED OTHERWISE.
21. GULLY GRATES AND FRAMES SHALL COMPLY WITH THE RELEVANT PROVISIONS OF BS EN124 AND BE OF A NON-ROCKING DESIGN WITH FLAT CYLINDRICAL ACCESS AND BE KITEMARKED. CLASS D400 FOR HIGHWAYS AND CLASS B125 FOR FOOTWAYS AND NON TRAFFICKED AREAS.
22. BACKFILLING AND REINSTATEMENT TO TRENCHES IN HIGHWAYS SHALL BE IN ACCORDANCE WITH THE REQUIREMENTS AND SPECIFICATIONS OF THE ADOPTING AUTHORITY, OR, IN THE ABSENCE OF SUCH, IN ACCORDANCE WITH THE REQUIREMENTS OF "THE STREET WORKS REGULATIONS 1992" AND RELEVANT PROVISIONS OF H.A.U.C. "SPECIFICATION FOR THE REINSTATEMENT OF OPENINGS IN HIGHWAYS" JUNE 1992, BOTH UNDER SECTION 71 OF THE NEW ROADS AND STREET WORKS ACT 1991.
23. ALL SIPHONIC DRAINAGE DOWN PIPES TO MANUFACTURER SPECIFICATION.
24. ALL ROAD GULLIES ARE TO BE TRAPPED GULLIES.
25. ALL GULLY LEADS TO BE 150mm DIAMETER.
26. ALL REDUNDANT EXISTING DRAINAGE TO BE GRUBBED UP OR GROUTED. ANY EXISTING LIVE DRAINAGE SHOULD BE REPORTED TO THE ENGINEER AND RECONNECTED.
27. ALL ROAD GULLIES & LEADS TO BE CLEARED OF DEBRIS UPON COMPLETION OF WORKS.
28. THE CONTRACTOR MUST ENSURE THAT ANY OF THE EXISTING DRAINAGE WHICH IS LIVE IS KEPT CLEAR OF DEBRIS AND SHOULD ALOW FOR JETTING THROUGH THE NEW & EXISTING DRAINAGE UPON COMPLETION.
29. CARE SHALL BE TO TAKE MEASURES TO PROTECT HIS OPERATIVES WITH RESPECT TO THE PRESENCE OF GAS IN SEWER TRENCHES AND MANHOLES THROUGH THE USE OF GAS MONITORING EQUIPMENT AND BREATHING APPARATUS AS REQUIRED.
30. CONTRACTOR TO APPLY FOR SEWER PERMITS AND ROAD OPENING PERMITS AS NECESSARY FROM THE APPROPRIATE AUTHORITIES, PRIOR TO COMMENCING WORKS.
31. WHERE PLASTIC PIPES ARE INSTALLED PRIOR TO GETTING APPROVAL THAN A LIGHT LINE CCTV SURVEY AND REPORT (ELECTRONIC DEFLECTION TESTING) OF THE PROSPECTIVELY SEWERS ARE REQUIRED PRIOR TO APPROVAL AT THE DEVELOPERS EXPENSE.

DESIGN NOTES:

1. ALL WORKS TO COMPLY WITH CURRENT VERSION OF THE FOLLOWING DOCUMENTS:
   - DESIGN MANUAL FOR ROADS AND BRIDGES (DMRB)
   - SPECIFICATION FOR HIGHWAY WORKS (SHW)
   - LOCAL AUTHORITY DESIGN GUIDE AND SPECIFICATION
2. PRIOR TO COMMENCING WORKS THE CONTRACTOR SHOULD INVESTIGATE AND LOCATE AS NECESSARY ANY STATUTORY UNDERTAKERS EQUIPMENT WITHIN THE NEW ACCESS AND DISCUSS REQUIREMENTS FOR LOWERING/DIVERSION AND PROTECTION WITH THE RELEVANT UNDERTAKER.
3. ALL WORKS WITHIN THE PUBLIC HIGHWAY TO MEET LOCAL AUTHORITY REQUIREMENTS.
4. CONTRACTOR TO APPLY FOR ROAD OPENING NOTICES ETC AS REQUIRED.
5. CBR VALUE NOT AVAILABLE. ROAD CONSTRUCTION DETAIL SUBJECT TO CONFIRMATION OF CBR VALUES. CONTRACTOR TO ALLOW FOR LAB TESTS TO BE UNDERTAKEN IN AGREEMENT WITH LOCAL AUTHORITY HIGHWAY ENGINEER PRIOR TO WORKS COMMENCING.
6. PROPOSED LEVELS HAVE BEEN BASED ON THE AS BUILT EARTHWORKS TOPOGRAPHIC SURVEY PROVIDED BY **HOWARD CIVIL ENGINEERING PLAT1&2 LEVELS BY DATED AUGUST 2021.**
7. PROPOSED DRAINING BASED ON ARCHITECTURAL LAYOUT BY **THE HARRIS PARTNERSHIP ARCHITECTS REF: 10906.3-111) RECEIVED JANUARY 2022.**

DRAINAGE NOTES:

1. ALL PIPES 1000 UNLESS OTHERWISE STATED.
2. ALL PRIVATE FOUL WATER PIPES NOT ANNOTATED TO BE A MINIMUM OF 100Ø INSTALLED AT 1:40.
3. ALL PRIVATE SURFACE WATER PIPES NOT ANNOTATED TO BE A MINIMUM OF 100Ø INSTALLED AT 1:100.
4. ALL FPVCs OVER 1.2m DEEP TO BE PROVIDED WITH REDUCED ACCESS COVER AND FRAME IN ACCORDANCE WITH BUILDING REGULATIONS PART H.
5. ALL PIPES IN TRAFFICKED AREAS TO HAVE 0400 COVERS & CONCRETE SURROUND.
6. ALL INTERNAL PLOT DRAINAGE REQUIRES CONFIRMATION PRIOR TO CONSTRUCTION.
7. CONTRACTOR TO CONFIRM MH COVER & INVERT LEVEL OF PROPOSED CONNECTION POINT PRIOR TO CONSTRUCTION. ANY VARIATION TO BE REPORTED TO ENGINEER.
8. THE INVERT LEVEL OF THE EXISTING SEWERS ARE TO BE VERIFIED PRIOR TO COMMENCEMENT OF ANY DRAINAGE WORKS. ANY DISCREPANCY MUST BE NOTIFIED TO THE ENGINEER.
9. CONTRACTOR TO ALLOW FOR ALL NECESSARY TEMPORARY WORKS IN CONNECTION WITH THE CONNECTIONS. CONTRACTOR TO APPLY TO THE WATER AUTHORITY FOR THE SECTION 106 APPROVAL TO MAKE THE CONNECTIONS. PIPES ARE TO BE LAID WITH COMMON INVERT LEVELS.
10. ALL STUB PIPES ARE TO BE CAPPED.
11. ALL PIPES CONNECTIONS TO BE SOFFIT TO SOFFIT UNLESS STATED OTHERWISE. REFER TO MANHOLE SCHEDULE FOR FURTHER INFORMATION.

KEY

INDICATIVE SITE BOUNDARY	PROPOSED PLOT SURFACE WATER PPC
MAJOR CONTOUR	PROPOSED PLOT SW ACCESS CHAMBER (300Ø)
MINOR CONTOUR	PROPOSED RODDING EYE
PROPOSED INFRASTRUCTURE SURFACE WATER	PROPOSED CLASS 1 SEPARATOR & VENT (VP)
PROPOSED INFRASTRUCTURE FOUL WATER	PROPOSED DRAINAGE CHANNEL
PROPOSED EASEMENT	PROPOSED PLOT GULLY
PROPOSED HIGHWAY DRAIN	PROPOSED SIPHONIC RAINWATER PIPE
PROPOSED HIGHWAY GULLY	PROPOSED PLOT FOUL WATER
PROPOSED PLOT SURFACE WATER	PROPOSED PLOT FOUL WATER MANHOLE
PROPOSED PERFORATED LAND DRAIN PIPE	PROPOSED PLOT FW ACCESS CHAMBER (300Ø)
PROPOSED PLOT SURFACE WATER MANHOLE	PROPOSED BACKDROP CONNECTION

0 10 20 Metres

AS-BUILT DRAWING - DRAWING REFLECTS AS BUILT INFORMATION PROVIDED BY THE CONTRACTOR

Date	Revisions	Drawn	Checked	Rev
21.10.2022	AS-BUILT DRAWING RECORD	VW	AMF	A1

Dwg Status: AS-BUILT

NORTH EAST 0191 2080632

YORKSHIRE 0113 5323500

RWO CONSULTING ENGINEERS

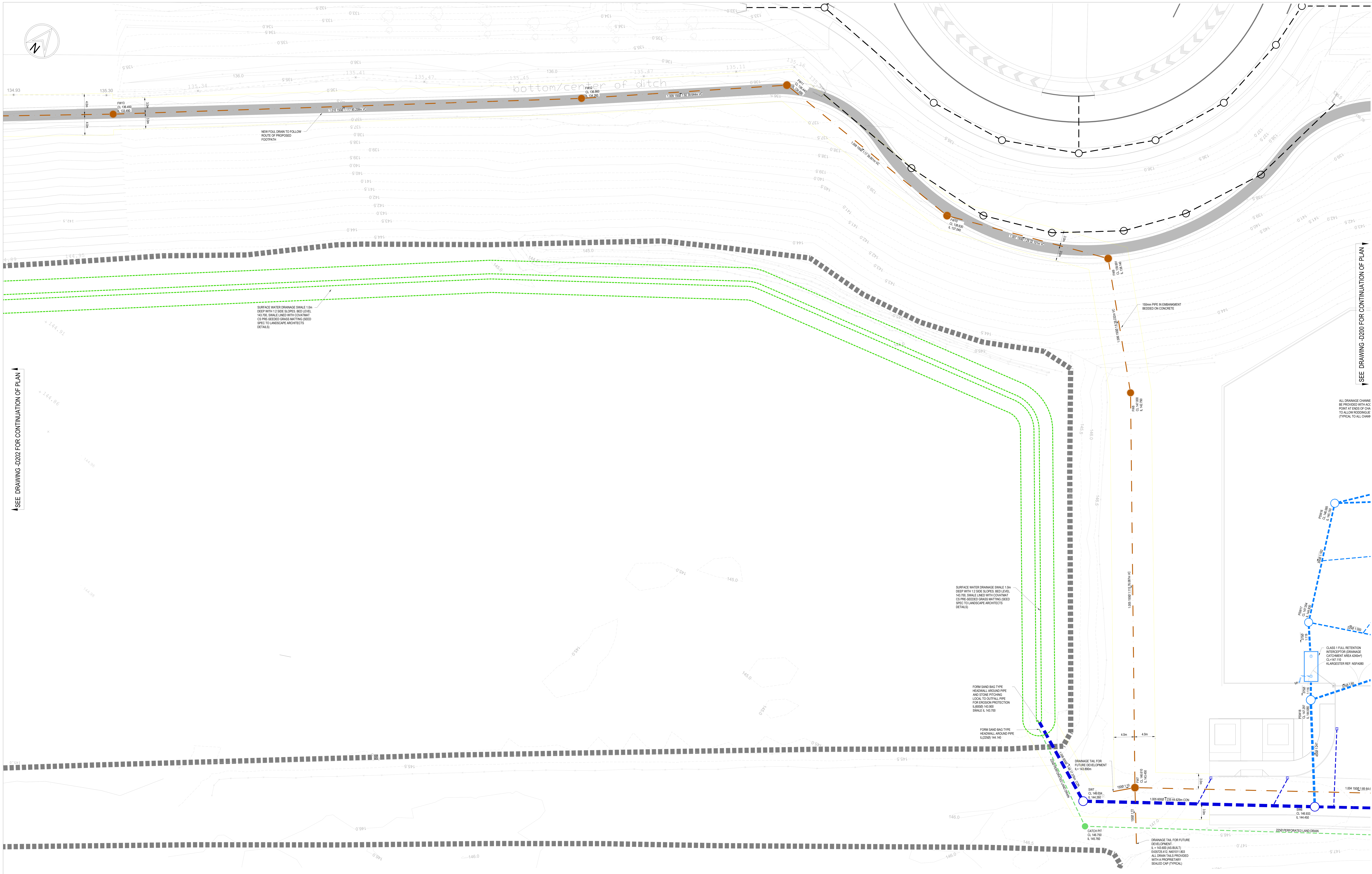
WWW.RWO.GROUP INFO@RWO.GROUP

Client: HARWORTH GROUP

Project: GATEWAY 36 BIRDWELL

Title: PROPOSED DRAINAGE LAYOUT SHEET 1 OF 3

DO NOT SCALE	Scale @ A0: 1:250	Drawn: VW	Checked: AMF	Date: 10.05.21
Job No: Y20112	Dwg No: D200			Rev: A1



HEALTH & SAFETY:

1. CONTRACTOR SHOULD BE AWARE OF GENERAL CONSTRUCTION RISKS TO PREVENT SLIPS, TRIPS AND FALLS AND TAKE NECESSARY PRECAUTIONS WITHOUT SPECIAL INSTRUCTION.

ROADS & DRAINAGE

2. CONTRACTOR TO PROVIDE TRENCH SUPPORTS AS APPROPRIATE AND ENSURE THAT PLANT REMAINS A SAFE DISTANCE FROM TRENCHES PRIOR TO INSTALLING DRAINAGE
3. THE TIME THAT EXCAVATIONS ARE OPEN ON SITE SHOULD BE KEPT TO A MINIMUM AND ALL TRENCHES SHOULD BE SURROUNDED BY A BARRIER.
4. CONNECTIONS TO EXISTING SEWERS TO BE MADE BY APPROVED CONTRACTOR ONLY.
5. CONTRACTOR TO MAKE OPERATIVES AWARE OF ASSOCIATED DANGERS TO HEALTH SUCH AS LEPTOSPIROSIS (WEILS DISEASE) AND RECOMMENDED PRECAUTIONS. ADEQUATE WELFARE FACILITIES AND PROTECTIVE CLOTHING TO BE PROVIDED AS REQUIRED.
6. UNFINISHED MANHOLES MUST BE COVERED WITH LOAD BEARING MATERIALS AND SURROUNDED WITH BARRIER.

PIPES & CABLES

7. CONTRACTOR TO OBTAIN ALL SERVICE RECORDS PRIOR TO WORKS COMMENCING.
8. SERVICE RECORDS TO BE REFERRED TO PRIOR TO WORK COMMENCING. CONTRACTOR TO PROCEED WITH CAUTION AND SERVICES TO BE LOCATED BY HAND DIG AND PROTECTED ACCORDINGLY.

EXCAVATION/FILL

9. CONTRACTOR TO ENSURE RELEVANT MEASURES ARE TAKEN TO KEEP PLANT AND PEOPLE A SAFE DISTANCE FROM STEEP SLOPES DURING THE WORKS.
10. CONTRACTOR TO ENSURE THAT PROCEDURES ARE IN PLACE TO KEEP PEOPLE A SAFE DISTANCE FROM WORKING PLANT WHERE NECESSARY.
11. CONTRACTOR TO REFER TO GROUND INVESTIGATION REPORT FOR CONTAMINATION TESTS AND TO PROVIDE ADEQUATE WELFARE FACILITIES AND PROTECTIVE CLOTHING AS REQUIRED.

SEWER NOTES

- ALL SEWERS TO BE BSI KITEMARK **(CERTIFIED TO WIS 4-35-01)**
- SEWER PIPES TO BE LAID IN MAXIMUM 3 METRE LENGTHS UNLESS THERE IS A SPECIFIC OPERATIONAL NEED TO LAY LONGER LENGTHS
- PLASTIC CHANNEL SECTIONS IN MANHOLES ARE NOT ACCEPTABLE AND CLAYWARE CHANNEL SHALL BE USED. PLASTIC CHANNELS ARE DIFFICULT TO SET IN CONCRETE BECAUSE THEY FLOAT AND A SATISFACTORY FINISH CANNOT BE OBTAINED ON THE BENCHING.

DRAINAGE SPECIFICATIONS FOR YORKSHIRE WATER

1. ALL SEWER WORKS AND MATERIALS TO BE IN ACCORDANCE WITH THE "DESIGN AND CONSTRUCTION GUIDANCE UNDER THE CODE FOR ADOPTION AGREEMENTS", THE RELEVANT BRITISH/EUROPEAN AND YORKSHIRE WATER'S STANDARDS/REQUIREMENTS/ADDENDUM TO THE MECHANICAL AND ELECTRICAL SPECIFICATION AND KITEMARKED.
2. MANHOLE COVERS SHALL/MUST HAVE A CLEAR OPENING OF 600mm AND SHALL BE CLASS D400 TO BS EN 124 WITH 150mm DEEP FRAMES IN HIGHWAYS.
3. FILLED GROUND MUST BE FILLED AND CONSOLIDATED UNDER THE SUPERVISION AND TO THE SATISFACTION OF YORKSHIRE WATER BEFORE ANY SEWER WORKS ARE CARRIED OUT.
4. COVER SLABS MUST CARRY THE BSI KITEMARK OR WILL BE REJECTED BY YORKSHIRE WATER INSPECTOR. WHERE THE CLEAR OPENING OF THE KITEMARKED PRODUCT IS DIFFERENT TO THAT OF THE COVER AND FRAME, A LOADING BEARING SLAB SHOULD BE FITTED ABOVE THE COVER SLAB TO BRING THE SIZE DOWN TO 600mm X 600mm FOR THE YORKSHIRE WATER SPECIFIED COVER SIZE. PLEASE REFER TO CONCRETE PIPE SYSTEMS ASSOCIATION (CPSA), 'TECHNICAL BULLETIN' ISSUED AUTUMN 2004 FOR KITEMARKED COVER SLAB OPENING SIZES.
5. SULPHATE RESISTANT CEMENT (C20-DC2) AND PRECAST CONCRETE PRODUCTS MUST BE USED OR A LABORATORY REPORT PROVIDED PROVING THAT SUCH PRECAUTIONS ARE NOT NECESSARY.
6. THE ADOPTABLE SEWERS SHOULD BE A MINIMUM OF 1m AND MANHOLES 0.5m FROM KERB FACES AND SERVICE MARGINS.
7. "SEWERS MUST HAVE 5 METRES CLEARANCE FROM TREES AND HEDGES (PLEASE ALSO REFER TO FIGURE 2.3 ON PAGE 33 IN "SEWERS FOR ADOPTION" 6TH EDITION FOR RESTRICTIONS ON TREE PLANTING ADJACENT TO SEWERS)".
8. SEWERS TO BE LAID IN CLASS "S" BEDDING (150mm GRANULAR BED AND SURROUND). WHERE DEPTH OF COVER TO TOP OF THE SEWER IS LESS THAN 1.2m IN HIGHWAYS AND VERGES (OR LESS THAN 900mm IN NONE VEHICULAR ACCESS AREAS) THEN A CONCRETE SLAB SHOULD BE PROVIDE ABOVE GRANULAR BED AND SURROUND.
9. BEDDING AND BACKFILL MATERIAL TO CONFORM TO THE REQUIREMENT OF WATER INDUSTRY SPECIFICATION 4-08-02 (TABLE A2).
10. THE CHAMBER SIZE OF MANHOLES WITH MORE THAN ONE CONNECTION IN THEM MAY NEED TO BE INCREASED AN INCREMENT TO ACCOMMODATE THE CONNECTIONS AND BENDS.
11. ALL PLASTIC SEWER PIPES TO BE KITEMARKED (CERTIFIED TO WIS 4-35-01 AND BS/EN13476). PLASTIC SEWER PIPES TO BE LAID IN MAXIMUM 3 METRE LENGTHS UNLESS THERE IS A SPECIFIC OPERATIONAL NEED TO LAY LONGER LENGTHS.
12. WHERE A B125 COVER AND FRAME HAS BEEN APPROVED, THIS MUST NOT BE COATED IN PLASTIC AND MUST HAVE LIFTING EYES SUITABLY SIZED TO ACCOMMODATE STANDARD LIFTING KEYS. SCREW DOWN COVERS ARE NOT ACCEPTABLE.

OTHER DRAINAGE NOTES

13. ALL PRIVATE DRAINAGE WORKS SHALL BE CARRIED OUT IN ACCORDANCE WITH BUILDING REGULATIONS 2002 EDITION.
14. CONTRACTOR TO ESTABLISH POSITION SIZE AND DEPTH OF ALL EXISTING SEWERS AND SERVICES PRIOR TO COMMENCEMENT ON SITE.
15. THE CONTRACTOR SHALL ALLOW FOR THE PROTECTION, TEMPORARY AND PERMANENT SUPPORT, AND TEMPORARY AND PERMANENT DIVERSION WORKS, AS NECESSARY TO ALL EXISTING SERVICES.
16. THE CONTRACTOR SHALL ALLOW FOR ALL TRAFFIC MANAGEMENT IN CONNECTION WITH ROAD AND SEWER WORKS.
17. THE CONTRACTOR SHALL ALLOW FOR KEEPING SEWER TRENCHES AND EXCAVATIONS AS DRY AS PRACTICABLE BY PUMPING FROM TEMPORARY SUMPS AND DEWATERING AS APPROPRIATE. THE POINT AND METHOD OF DISCHARGE TO BE AGREED WITH THE DRAINAGE AUTHORITY.
18. FOR PIPE SPECIFICATION PLEASE REFER TO ADDITIONAL NOTES.
19. VITRIFIED CLAY PIPES AND FITTINGS SHALL COMPLY WITH THE RELEVANT PROVISIONS OF BS EN295 AND BS 65 RESPECTIVELY AND BE KITEMARKED. ALL PIPES SHALL BE EXTRA STRENGTH TO BS 65 OR EQUIVALENT BS EN295 PIPE CRUSHING STRENGTH.
20. PRECAST CONCRETE PRODUCTS SHALL COMPLY WITH THE RELEVANT PROVISIONS OF BS 5911 AND BE KITEMARKED. CONCRETE PIPES TO BE CLASS 120 UNLESS NOTED OTHERWISE.
21. GULLY GRATES AND FRAMES SHALL COMPLY WITH THE RELEVANT PROVISIONS OF BS EN124 AND BE OF A NON-ROCKING DESIGN WITH CAPTIVE HINGE ACCESS AND BE KITEMARKED. LOAD CLASS D400 FOR ROADS AND SERVICE YARD AREAS. CLASS C250 TO BE USED IN CAR PARKING AREAS.
22. BACKFILLING AND REINSTATEMENT TO TRENCHES IN HIGHWAYS SHALL BE IN ACCORDANCE WITH THE REQUIREMENTS AND SPECIFICATIONS OF THE ADOPTING AUTHORITY, OR, IN THE ABSENCE OF SUCH, IN ACCORDANCE WITH THE REQUIREMENTS OF "THE STREET WORKS REGULATIONS 1992" AND RELEVANT PROVISIONS OF H.A.U.C. "SPECIFICATION FOR THE REINSTATEMENT OF OPENINGS IN HIGHWAYS" JUNE 1992, BOTH UNDER SECTION 71 OF THE NEW ROADS AND STREET WORKS ACT 1991.
23. ALL SIPHONIC DRAINAGE DOWN PIPES TO MANUFACTURER SPECIFICATION.
24. ALL ROAD GULLIES ARE TO BE TRAPPED GULLIES.
25. ALL GULLY LEADS TO BE 150mm DIAMETER.
26. ALL REDUNDANT EXISTING DRAINAGE TO BE GRUBBED UP OR GROUTED, ANY EXISTING LIVE DRAINAGE SHOULD BE REPORTED TO THE ENGINEER AND RECONNECTED.
27. ALL ROAD GULLIES & LEADS TO BE CLEARED OF DEBRIS UPON COMPLETION OF WORKS.
28. THE CONTRACTOR MUST ENSURE THAT ANY OF THE EXISTING DRAINAGE WHICH IS LIVE IS KEPT CLEAR OF DEBRIS AND SHOULD ALLOW FOR JETTING THROUGH THE NEW & EXISTING DRAINAGE UPON COMPLETION.
29. CONTRACTOR TO TAKE MEASURES TO PROTECT HIS OPERATIVES WITH RESPECT TO THE PRESENCE OF GAS IN SEWER TRENCHES AND MANHOLES THROUGH THE USE OF GAS MONITORING EQUIPMENT AND BREATHING APPARATUS AS REQUIRED.
30. CONTRACTOR TO APPLY FOR SEWER PERMITS AND ROAD OPENING PERMITS AS NECESSARY FROM THE APPROPRIATE AUTHORITIES, PRIOR TO COMMENCING WORKS.
31. WHERE PLASTIC PIPES ARE INSTALLED PRIOR TO GETTING APPROVAL THEN A LIGHT LINE CCTV SURVEY AND REPORT (ELECTRONIC DEFLECTION TESTING) OF THE PROSPECTIVELY SEWERS ARE REQUIRED PRIOR TO APPROVAL AT THE DEVELOPERS EXPENSE.

DESIGN NOTES:

1. ALL WORKS TO COMPLY WITH CURRENT VERSION OF THE FOLLOWING DOCUMENTS:
   - DESIGN MANUAL FOR ROADS AND BRIDGES (DMRB)
   - SPECIFICATION FOR HIGHWAY WORKS (SHW)
   - LOCAL AUTHORITY DESIGN GUIDE AND SPECIFICATION
2. PRIOR TO COMMENCING WORKS THE CONTRACTOR SHOULD INVESTIGATE AND LOCATE AS NECESSARY ANY STATUTORY UNDERTAKERS EQUIPMENT WITHIN THE NEW ACCESS AND DISCUSS REQUIREMENTS FOR LOWERING/DIVERSION AND PROTECTION WITH THE RELEVANT UNDERTAKER.
3. ALL WORKS WITHIN THE PUBLIC HIGHWAY TO MEET LOCAL AUTHORITY REQUIREMENTS. CONTRACTOR TO APPLY FOR ROAD OPENING NOTICES ETC AS REQUIRED.
4. CBR VALUE NOT AVAILABLE. ROAD CONSTRUCTION DETAIL SUBJECT TO CONFIRMATION OF CBR VALUES. CONTRACTOR TO ALLOW FOR LAB TESTS TO BE UNDERTAKEN IN AGREEMENT WITH LOCAL AUTHORITY HIGHWAY ENGINEER PRIOR TO WORKS COMMENCING.
5. PROPOSED LEVELS HAVE BEEN BASED ON THE AS BUILT EARTHWORKS TOPOGRAPHIC SURVEY PROVIDED **BY HOWARD CIVIL ENGINEERING PLATEAU LEVELS BY DATED AUGUST 2021.**
6. PROPOSED DRAWING BASED ON ARCHITECTURAL LAYOUT BY **THE HARRIS PARTNERSHIP ARCHITECTS REF: 12006-2-111J RECEIVED JANUARY 2022.**

DRAINAGE NOTES:

1. ALL PIPES 100Ø UNLESS OTHERWISE STATED.
2. ALL PRIVATE FOUL WATER PIPES NOT ANNOTATED TO BE A MINIMUM OF 100Ø INSTALLED AT 1:40; ALL PRIVATE SURFACE WATER PIPES NOT ANNOTATED TO BE A MINIMUM OF 100Ø INSTALLED AT 1:100.
3. ALL PPICs OVER 1.2m DEEP TO BE PROVIDED WITH REDUCED ACCESS COVER AND FRAME IN ACCORDANCE WITH BUILDING REGULATIONS PART H.
4. ALL PPICS IN TRAFFICKED AREAS TO HAVE D400 COVERS & CONCRETE SURROUND.
5. ALL INTERNAL PLOT DRAINAGE REQUIRES CONFIRMATION PRIOR TO CONSTRUCTION.
6. CONTRACTOR TO CONFIRM MH COVER & INVERT LEVEL OF PROPOSED CONNECTION POINT PRIOR TO CONSTRUCTION. ANY VARIATION TO BE REPORTED TO ENGINEER.
7. THE INVERT LEVEL OF THE EXISTING SEWERS ARE TO BE VERIFIED PRIOR TO COMMENCEMENT OF ANY DRAINAGE WORKS. ANY DISCREPANCY MUST BE NOTIFIED TO THE ENGINEER.
8. EXISTING MANHOLES TO BE MODIFIED TO ACCOMMODATE THE PROPOSED LATERAL CONNECTIONS. CONTRACTOR TO APPLY TO THE WATER AUTHORITY FOR THE SECTION 106 APPROVAL TO MAKE THE CONNECTIONS. PIPES ARE TO BE LAID WITH COMMON INVERT LEVELS.
9. ALL STUB PIPES ARE TO BE CAPPED.
10. ALL PIPES CONNECTIONS TO BE SOFFIT TO SOFFIT UNLESS STATED OTHERWISE. REFER TO MANHOLE SCHEDULE FOR FURTHER INFORMATION.

AS-BUILT DRAWING - DRAWING REFLECTS AS BUILT INFORMATION PROVIDED BY THE CONTRACTOR

KEY

Symbol	Description	Symbol	Description
	INDICATIVE SITE BOUNDARY	SWIC CL 0.000 IL 0.000	PROPOSED PLOT SURFACE WATER PPIC
	MAJOR CONTOUR		PROPOSED PLOT SW ACCESS CHAMBER (300Ø)
	MINOR CONTOUR	RE	PROPOSED RODDING EYE
150Ø 1:150 SW## CL 0.000 IL 0.000	PROPOSED INFRASTRUCTURE SURFACE WATER	VP	PROPOSED CLASS 1 SEPARATOR WITH VENT (VP)
150Ø 1:150 FW## CL 0.000 IL 0.000	PROPOSED INFRASTRUCTURE FOUL WATER	DC	PROPOSED DRAINAGE CHANNEL
	PROPOSED EASEMENT	G	PROPOSED PLOT GULLY
150Ø 1:150 HW## CL 0.000 IL 0.000	PROPOSED HIGHWAY DRAIN	SRWP	PROPOSED SIPHONIC RAINWATER PIPE
G	PROPOSED HIGHWAY GULLY	150Ø 1:150	PROPOSED PLOT FOUL WATER
150Ø 1:150	PROPOSED PLOT SURFACE WATER	FWMH CL 0.000 IL 0.000	PROPOSED PLOT FOUL WATER MANHOLE
	PROPOSED PERFORATED LAND DRAIN PIPE		PROPOSED PLOT FW ACCESS CHAMBER (300Ø)
SWMH CL 0.000 IL 0.000	PROPOSED PLOT SURFACE WATER MANHOLE	BD	PROPOSED BACKDROP CONNECTION

0 10 20 Metres

Date	Revisions	Drawn	Checked	Rev
21.10.2022	AS-BUILT DRAWING RECORD	VW	AMF	A1

Dwg Status: AS-BUILT

RWO CONSULTING ENGINEERS
NORTH EAST 0191 2585632
YORKSHIRE 0113 5323500
WWW.RWO.GROUP
INFO@RWO.GROUP

Client: HARWORTH GROUP

Project: GATEWAY 36 BIRDWELL

Title: PROPOSED DRAINAGE LAYOUT SHEET 2 OF 3

DO NOT SCALE	Scale @ A0: 1:250	Drawn AMF	Checked VW	Date 10.05.21
Job No Y20112		Dwg No D201		Rev A1



SEE DRAWING -D201 FOR CONTINUATION OF PLAN

HEALTH & SAFETY:

1. CONTRACTOR SHOULD BE AWARE OF GENERAL CONSTRUCTION RISKS TO PREVENT SLIPS, TRIPS AND FALLS AND TAKE NECESSARY PRECAUTIONS WITHOUT SPECIAL INSTRUCTION.

ROADS & DRAINAGE

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4. CONNECTIONS TO EXISTING SEWERS TO BE MADE BY APPROVED CONTRACTOR ONLY.
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2. MANHOLE COVERS SHALL/MUST HAVE A CLEAR OPENING OF 600mm AND SHALL BE CLASS D400 TO BS EN 124 WITH 150mm DEEP FRAMES IN HIGHWAYS.
3. FILLED GROUND MUST BE FILLED AND CONSOLIDATED UNDER THE SUPERVISION AND TO THE SATISFACTION OF YORKSHIRE WATER BEFORE ANY SEWER WORKS ARE CARRIED OUT.
4. COVER SLABS MUST CARRY THE BSI KITEMARK OR WILL BE REJECTED BY YORKSHIRE WATER INSPECTOR. WHERE THE CLEAR OPENING OF THE KITEMARKED PRODUCT IS DIFFERENT TO THAT OF THE COVER AND FRAME, A LOADING BEARING SLAB SHOULD BE FITTED ABOVE THE COVER SLAB TO BRING THE SIZE DOWN TO 600mm X 600mm FOR THE YORKSHIRE WATER SPECIFIED COVER SIZE. PLEASE REFER TO CONCRETE PIPE SYSTEMS ASSOCIATION (CPSA), 'TECHNICAL BULLETIN' ISSUED AUTUMN 2004 FOR KITEMARKED COVER SLAB OPENING SIZES.
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8. SEWERS TO BE LAID IN CLASS "S" BEDDING (150mm GRANULAR BED AND SURROUND). WHERE DEPTH OF COVER TO TOP OF THE SEWER IS LESS THAN 1.2m IN HIGHWAYS AND VERGES (OR LESS THAN 900mm IN NONE VEHICULAR ACCESS AREAS) THEN A CONCRETE SLAB SHOULD BE PROVIDE ABOVE GRANULAR BED AND SURROUND.
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19. VITRIFIED CLAY PIPES AND FITTINGS SHALL COMPLY WITH THE RELEVANT PROVISIONS OF BS EN295 AND BS 65 RESPECTIVELY AND BE KITEMARKED. ALL PIPES SHALL BE EXTRA STRENGTH TO BS 65 OR EQUIVALENT BS EN295 PIPE CRUSHING STRENGTH.
20. PRECAST CONCRETE PRODUCTS SHALL COMPLY WITH THE RELEVANT PROVISIONS OF BS 5911 AND BE KITEMARKED. CONCRETE PIPES TO BE CLASS 120 UNLESS NOTED OTHERWISE.
21. GULLY GRATES AND FRAMES SHALL COMPLY WITH THE RELEVANT PROVISIONS OF BS EN124 AND BE OF A NON-ROCKING DESIGN WITH CAPTIVE HINGE ACCESS AND BE KITEMARKED. LOAD CLASS D400 FOR ROADS AND SERVICE YARD AREAS. CLASS C250 TO BE USED IN CAR PARKING AREAS.
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25. ALL GULLY LEADS TO BE 150mm DIAMETER.
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27. ALL ROAD GULLIES & LEADS TO BE CLEARED OF DEBRIS UPON COMPLETION OF WORKS.
28. THE CONTRACTOR MUST ENSURE THAT ANY OF THE EXISTING DRAINAGE WHICH IS LIVE IS KEPT CLEAR OF DEBRIS AND SHOULD ALLOW FOR JETTING THROUGH THE NEW & EXISTING DRAINAGE UPON COMPLETION.
29. CONTRACTOR TO TAKE MEASURES TO PROTECT HIS OPERATIVES WITH RESPECT TO THE PRESENCE OF GAS IN SEWER TRENCHES AND MANHOLES THROUGH THE USE OF GAS MONITORING EQUIPMENT AND BREATHING APPARATUS AS REQUIRED.
30. CONTRACTOR TO APPLY FOR SEWER PERMITS AND ROAD OPENING PERMITS AS NECESSARY FROM THE APPROPRIATE AUTHORITIES, PRIOR TO COMMENCING WORKS.
31. WHERE PLASTIC PIPES ARE INSTALLED PRIOR TO GETTING APPROVAL THEN A LIGHT LINE CCTV SURVEY AND REPORT (ELECTRONIC DEFLECTION TESTING) OF THE PROSPECTIVELY SEWERS ARE REQUIRED PRIOR TO APPROVAL AT THE DEVELOPERS EXPENSE.

DESIGN NOTES:

1. ALL WORKS TO COMPLY WITH CURRENT VERSION OF THE FOLLOWING DOCUMENTS:
   - DESIGN MANUAL FOR ROADS AND BRIDGES (DMRB)
   - SPECIFICATION FOR HIGHWAY WORKS (SHW)
   - LOCAL AUTHORITY DESIGN GUIDE AND SPECIFICATION
2. PRIOR TO COMMENCING WORKS THE CONTRACTOR SHOULD INVESTIGATE AND LOCATE AS NECESSARY ANY STATUTORY UNDERTAKERS EQUIPMENT WITHIN THE NEW ACCESS AND DISCUSS REQUIREMENTS FOR LOWERING/DIVERSION AND PROTECTION WITH THE RELEVANT UNDERTAKER.
3. ALL WORKS WITHIN THE PUBLIC HIGHWAY TO MEET LOCAL AUTHORITY REQUIREMENTS. CONTRACTOR TO APPLY FOR ROAD OPENING NOTICES ETC AS REQUIRED.
4. CBR VALUE NOT AVAILABLE. ROAD CONSTRUCTION DETAIL SUBJECT TO CONFIRMATION OF CBR VALUES. CONTRACTOR TO ALLOW FOR LAB TESTS TO BE UNDERTAKEN IN AGREEMENT WITH LOCAL AUTHORITY HIGHWAY ENGINEER PRIOR TO WORKS COMMENCING.
5. PROPOSED LEVELS HAVE BEEN BASED ON THE AS BUILT EARTHWORKS TOPOGRAPHIC SURVEY PROVIDED **BY HOWARD CIVIL ENGINEERING PLATEAU LEVELS BY DATED AUGUST 2021**.
6. PROPOSED DRAWING BASED ON ARCHITECTURAL LAYOUT BY **THE HARRIS PARTNERSHIP ARCHITECTS REF: 12006-2-111J RECEIVED JANUARY 2022.**

DRAINAGE NOTES:

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2. ALL PRIVATE FOUL WATER PIPES NOT ANNOTATED TO BE A MINIMUM OF 100Ø INSTALLED AT 1:40; ALL PRIVATE SURFACE WATER PIPES NOT ANNOTATED TO BE A MINIMUM OF 100Ø INSTALLED AT 1:100.
3. ALL PPICs OVER 1.2m DEEP TO BE PROVIDED WITH REDUCED ACCESS COVER AND FRAME IN ACCORDANCE WITH BUILDING REGULATIONS PART H.
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5. ALL INTERNAL PLOT DRAINAGE REQUIRES CONFIRMATION PRIOR TO CONSTRUCTION.
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7. THE INVERT LEVEL OF THE EXISTING SEWERS ARE TO BE VERIFIED PRIOR TO COMMENCEMENT OF ANY DRAINAGE WORKS. ANY DISCREPANCY MUST BE NOTIFIED TO THE ENGINEER.
8. EXISTING MANHOLES TO BE MODIFIED TO ACCOMMODATE THE PROPOSED LATERAL CONNECTIONS. CONTRACTOR TO APPLY TO THE WATER AUTHORITY FOR THE SECTION 106 APPROVAL TO MAKE THE CONNECTIONS. PIPES ARE TO BE LAID WITH COMMON INVERT LEVELS.
9. ALL STUB PIPES ARE TO BE CAPPED.
10. ALL PIPES CONNECTIONS TO BE SOFFIT TO SOFFIT UNLESS STATED OTHERWISE. REFER TO MANHOLE SCHEDULE FOR FURTHER INFORMATION.

AS-BUILT DRAWING - DRAWING REFLECTS AS BUILT INFORMATION PROVIDED BY THE CONTRACTOR

KEY

INDICATIVE SITE BOUNDARY	SWIC CL 0.000 IL 0.000 PROPOSED PLOT SURFACE WATER PPIC
MAJOR CONTOUR	PROPOSED PLOT SW ACCESS CHAMBER (300Ø)
MINOR CONTOUR	RE PROPOSED RODDING EYE
150Ø 1:150→ SW## CL 0.000 IL 0.000 PROPOSED INFRASTRUCTURE SURFACE WATER	VP PROPOSED CLASS 1 SEPARATOR WITH VENT (VP)
150Ø 1:150→ FW## CL 0.000 IL 0.000 PROPOSED INFRASTRUCTURE FOUL WATER	DC PROPOSED DRAINAGE CHANNEL
PROPOSED EASEMENT	PROPOSED PLOT GULLY
150Ø 1:150→ HW## CL 0.000 IL 0.000 PROPOSED HIGHWAY DRAIN	SRWP PROPOSED SIPHONIC RAINWATER PIPE
PROPOSED HIGHWAY GULLY	150Ø 1:150→ PROPOSED PLOT FOUL WATER
150Ø 1:150→ PROPOSED PLOT SURFACE WATER	FWMH CL 0.000 IL 0.000 PROPOSED PLOT FOUL WATER MANHOLE
PROPOSED PERFORATED LAND DRAIN PIPE	PROPOSED PLOT FW ACCESS CHAMBER (300Ø)
SWMH CL 0.000 IL 0.000 PROPOSED PLOT SURFACE WATER MANHOLE	PROPOSED BACKDROP CONNECTION

0 10 20 Metres

Date	Revisions	Drawn	Checked	Rev
21.10.2022	AS-BUILT DRAWING RECORD	VW	AMF	A1

Dwg Status: AS-BUILT

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Project: GATEWAY 36 BIRDWELL

Title: PROPOSED DRAINAGE LAYOUT SHEET 3 OF 3

DO NOT SCALE	Scale @ A0: 1:250	Drawn AMF	Checked VW	Date 10.05.21
Job No Y20112		Dwg No D202		Rev A1

Appendix C JPG Drainage and Flood Risk Statement

DRAINAGE & FLOOD RISK STATEMENT

Rockingham Phase 2 and 3
Barnsley

Reference	**4652-2-JPG-XX-XX-RP-D-0620-S2-P01**
Date	**December 2019**
Author	**JDM**

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Appendix B Topographic Survey

Appendix C Yorkshire Water Sewer Records

Appendix D Proposed Development Plan

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Appendix G Foul Water Drainage Calculations

CONFIDENTIALITY STATEMENT

This report is addressed to and may be relied upon by the following:

Harworth Group
Advantage House
Poplar Way
ROTHERHAM
S60 5TR

This report has been prepared for the sole use and reliance of the above named party. This report shall not be relied upon or transferred to any other parties without the express written authorisation of JPG (Leeds) Limited. No responsibility will be accepted where this report is used, either in its entirety or in part, by any other party.

DOCUMENT HISTORY

Rev	Date	Revision Details	Status	Author(s)	Approved
P01	16.12.2019	First Issue	Information	JDM	

1.0 INTRODUCTION

JPG (Leeds) Limited has been instructed by Harworth Group to carry out a Drainage and Flood Risk Assessment for a proposed commercial development on land immediately to the north and south of Dearne Valley Parkway.

The report will review the drainage and flood risk issues associated with the proposed development and recommend any mitigation which should take place as part of the development.

This document is prepared in accordance with the requirements of and in response to the Planning Practice Guidance & National Planning Policy Framework (NPPF) which states that those proposing particular developments are responsible for:

- Providing an assessment of whether any proposed development is likely to be affected by flooding and whether it will increase the flood risk elsewhere and of the measures proposed to deal with these effects and risks; and
- Satisfying the local planning authority that any flood risk to the development or additional risk arising from the proposal will be successfully managed with the minimum environmental effect, to ensure that the site can be developed and occupied safely.

NPPF defines flood zones as follows:

- Zone 1 – Low Probability – less than 1 in 1000 annual probability (< 0.1%) of river or sea flooding in any year.
- Zone 2 – Medium Probability – between a 1 in 100 and 1 in 1000 annual probability (1% - 0.1%) of river flooding or between a 1 in 200 and 1 in 1000 annual probability of sea flooding (0.5% - 0.1%) in any year.
- Zone 3a – High Probability – 1 in 100 or greater annual probability (> 1%) of river flooding or a 1 in 200 or greater annual probability of flooding from the sea (>0.5%) in any year.
- Zone 3b – Functional Floodplain – 1 in 20 or greater annual probability (5%) of river flooding in any year. This is land on which water has to flow or be stored in times of flood.

A Flood Risk Assessment is required for all sites in excess of 1ha within Zone 1 and all sites within Zones 2 and 3.

2.0 THE SITE

The site is located to the north east of Junction 36 of the M1 motorway, on both the north and south side of Dearne Valley Parkway, approximately 1.75km northwest of Hoyland town centre. The approximate centre of the site is located at NGR E435470, N401042.

Phase 2
The site is located to the south of Dearne Valley Parkway and is an irregular shape covering an area of approximately 28.037ha.

The site is bounded by Dearne Valley Parkway to the north, a bridle track running from the east around the southern boundary and beyond this is open fields.

To the west is as watercourse/ditch running from south to north including a small pond in the north west corner. Further over to the west is future development land.

The site comprises of restored former opencast working and currently is a mixture of fields interspaced with woodland areas.

The site generally falls from south to north in the order of 36.5m.

Phase 3
The site is located to the north of Dearne Valley Parkway and is an irregular shape covering an area of approximately 9.72ha.

The site is bounded by Dearne Valley Parkway to the south, open agricultural land to the north, an existing business park to the east and to the west is as watercourse/ditch, pond and further over an existing business park.

The site comprises of restored former opencast working and currently is a mixture of fields and interspaced with woodland areas.

The site generally falls from south to north in the order of 21.0m.

A Site Location Plan is located in Appendix A and topographic survey in Appendix B.

3.0 EXISTING DRAINAGE AND SEWER NETWORK

A Yorkshire Water public sewer plan is provided in Appendix C, this indicates the following public sewers in close proximity to the site:

- There is a 150 mm diameter public foul water sewer recorded to the north located within the phase 3 development land.

An open watercourse and pond exist running adjacent to the west of phase 2 which flows in a south to north direction.

This passes beneath Dearne Valley Parkway in a culvert and becomes open watercourse again with a further pond located to the west of Phase 3 development land.

This watercourse is understood to be a tributary of the downstream watercourse known as Short Wood Dike which is located to the north of the phase 3.

4.0 DEVELOPMENT PROPOSALS

It is proposed to develop both phase 2 and phase 3 sites for commercial development.

Proposed development area for phase 2 is approximately 28.00 Ha.
Impermeable area for Phase 2 is approximately 15.00 Ha.

Proposed development area for phase 3 is approximately 10.00 Ha.
Impermeable area for Phase 3 is approximately 6.500 Ha.

A proposed site plan is provided in Appendix D.

5.0 FLOOD RISK ASSESSMENT

Publicly available information on flooding obtained from the Environment Agency (EA) website database is provided in Appendix E.

The site is indicated to fall within Flood Zone 1 which comprises land assessed as having a low risk of flooding from watercourse and/or sea with less than a 1:1000 annual probability of river or sea flooding.

NPPF Technical Guidance states all uses of land are appropriate in Flood Zone 1.

As the site area is greater than 1ha other sources of flooding need to be considered.

These include:

- Adjoining land.
- Ground water.
- Flooding from sewers.
- Flooding from reservoirs, canals and other artificial sources.

5.1 Flooding from Adjoining Land

Phase 2
The site sits in an elevated position above land to the north (Dearne Valley Parkway).

To the south land is of a similar elevation to the site at the boundary.

The ground generally falls away to the south and west outside of the site boundary.

There is an area of higher ground in the south east corner, but this generally falls towards the east. Any overland flows from this area would pass the site to the east.

To the west is the existing watercourse/ditch which is at a considerably lower level then the proposed site. Therefore, overland flooding from this location is considered unlikely.

Phase 3
The site sits in an elevated position above the land to the north which is open fields and generally falls in a north east direction.

To the south land is of a similar elevation to the site at the boundary and is public highway (Dearne Valley Parkway).

Any runoff from the public highway would be contained within the confines of the highway and associated drainage system.

Land to both the east and west of the site generally falls from the south to the north and is of similar level to the proposed phase 3 development at the boundary.

Any overland flows from here would generally pass the site in a south to north direction. Therefore, overland flooding from these locations is considered unlikely.

The risk of flooding from adjoining land is considered to be **low**.

5.2 Flooding from Groundwater

The proposed sites will be in an elevated position in relation to the nearest watercourses, thus it is unlikely there will be an issue with groundwater effecting the site.

The risk of flooding from ground water is considered to be **low**.

5.3 Flooding from Sewers

The sewers in proximity to the site are public sewers owned by Yorkshire Water and will be subject to regular maintenance and inspection, therefore blockage of these sewers is unlikely.

The risk of flooding from sewers is considered to be **low**.

5.4 Flooding from Reservoirs, Canals and Other Artificial Sources

A surface water balancing pond is located to the west of the phase 3 site. This feature is understood to be a facility associated with the adjacent public highway (Dearne Valley Parkway), which is owned/maintained by the highway authority and will be subject to regular maintenance and inspection therefore blockage/overtopping of this facility unlikely.

There are no other known reservoirs, canals or artificial sources within the vicinity of the site. The site is therefore not at risk from such sources.

The risk of flooding from sewers is considered to be **low**.

6.0 SURFACE AND FOUL WATER DRAINAGE

The proposed site drainage will comprise of a separate surface and foul water drainage system.

The proposed drainage will be designed in accordance with current Building Regulations, SFA and industry best practice as required.

The following summarises the requirements for the discharge of surface and foul water from the site.

6.1 Sustainable Urban Drainage Systems (SUDS)

Initial investigations indicate the sites are underlain by significant depths of made ground/fill due to former mine workings in the area, therefore the disposal of surface water by infiltration methods is not deemed feasible.

Given the underlying ground strata the use of infiltration methods for the discharge of surface water is deemed unsuitable due to potential settlement issues associated with the made ground becoming inundated with surface water.

Sustainable Urban Drainage System (SUDS) may be used in conjunction with conventional drainage systems to improve water quality as well as manage surface water discharge.

The following audit has been carried out relating to suitability of SUD's systems.

Drainage Method	Description/Suitability	Proposal/Feasibility
1. Infiltration.	Methods not deemed suitable due to underlying ground strata	Not applicable.
2. Ponds and wetlands.	May be suitable if land is allocated	Applicable.
3. Infiltration Basins.	Methods not deemed suitable due to underlying ground strata	Not applicable.
4. Detention Basins.	May be suitable if land is allocated.	Applicable.
5. Swale.	May be utilised convey water.	Applicable.
6. French/Filter drain.	May be utilised convey water.	Applicable.
7. Pervious/Permeable Pavement.	Methods not deemed suitable due to underlying ground strata	Not applicable.
8. Geocellular Systems/Tank systems.	May be used as surface water attenuation.	Applicable.
9. Oversized pipes.	May be used as surface water attenuation.	Applicable.
10. Box culverts.	May be used as surface water attenuation.	Applicable.
11. Purpose designed tanks.	May be used as surface water attenuation.	Applicable.

6.2 Surface Water Drainage

The disposal of surface water shall be in accordance with the Requirement H3 of Building Regulations 2000. This establishes a preferred hierarchy for surface water disposal. Consideration should firstly be given to discharge to soakaway/infiltration system, watercourse and public sewer in that priority order.

As noted in Section 6.1 the discharge of surface water drainage via infiltration methods is not feasible, therefore the second consideration should be discharge to watercourse.

The nearest watercourse is a tributary of the downstream watercourse known as Short Wood Dike. Short Wood Dike is located within land to the north of phase 3.

The tributary which passes adjacent to both phases of the development is located to the west and runs in a south to north direction passing beneath Dearne Valley Parkway.

This is the proposed location for discharge of surface water from both phases. Surface water discharge from the both sites would be restricted to agreed rates with the LLFA (Barnsley).

In previous consultation with Barnsley MDC land drainage department as part of the Hoyland Master Plan Strategy which cover phase 2 of the development. BMDC confirmed a greenfield discharge rate of 4.4 litres/second/hectare is applicable for the area which covers phase 2.

Based on the above figure the greenfield run off for the two phases would be as follows:

- Phase 2 impermeable area approximately 15.00Ha x 4.4l/s/ha = 66.0 l/s.
- Phase 3 impermeable area approximately 6.50Ha x 4.4l/s/ha = 28.6 l/s.

In addition, greenfield run-off calculations have also been prepared using Windes Micro Drainage software and results are located in Appendix F.

Greenfield run off based on the Micro Drainage calculations would be as follows:

- Phase 2 impermeable area approximately 15.00Ha (QBAR) = 62.2 l/s.
- Phase 3 impermeable area approximately 6.50Ha (QBAR) = 26.9 l/s.

The lower of the above figures will be used to calculate preliminary attenuation volumes.

Phase 2 Attenuation Volumes
Given the restricted surface water discharge rate on-plot surface water attenuation will be required, it is proposed this will be provided in a detention basin to the west of the site.

The following provides a brief calculation of the approximate volumes of attenuation using the 'Quick Storage Estimate' element of Windes Microdrainage:

Storage Design Parameters

- Restricted discharge rate = 62.2 litres/second.
- Site area to be developed = 28.00Ha.
- Proposed Impermeable area = 15.00 Ha. (53.5% impermeable).
- M5-60 = 19.0.
- Ratio R = 0.363

- 1:2 Year Return Period = 2089-3366 m^3.
- 1:30 Year Return Period = between 4736-6916 m^3.
- 1:100 Year Return Period (+30% cc) = between 9280-12909 m^3.

The proposed onsite drainage system shall be designed in accordance with the requirements of Building Regulations and Sewers for Adoption and shall demonstrate that:

- No surcharge of pipes occurs in the 1 in 2-year rainfall event.
- No surface flooding occurs in 1 in 30-year rainfall event.
- No flooding to buildings and adjacent properties occurs in 1 in 100-year rainfall event (including an allowance of 30% for the effects of future climate change), as defined in NPPF Technical Guidance.

Phase 3 Attenuation Volumes

Given the restricted surface water discharge rate on-plot surface water attenuation will be required, it is proposed this will be provided in a detention basin to the north of the site.

The following provides a brief calculation of the approximate volumes of attenuation using the 'Quick Storage Estimate' element of Windes Microdrainage:

Storage Design Parameters

- Restricted discharge rate = 28.6 litres/second.
- Site area to be developed = 10.00Ha.
- Proposed Impermeable area = 6.50 Ha. (65.0% impermeable).
- M5-60 = 19.0.
- Ratio R = 0.363
- 1:2 Year Return Period = 884-1420 m^3.
- 1:30 Year Return Period = between 2010-2939 m^3.
- 1:100 Year Return Period (+30% cc) = between 3953-5511m^3.

The proposed onsite drainage system shall be designed in accordance with the requirements of Building Regulations and Sewers for Adoption and shall demonstrate that:

- No surcharge of pipes occurs in the 1 in 2-year rainfall event.
- No surface flooding occurs in 1 in 30-year rainfall event.
- No flooding to buildings and adjacent properties occurs in 1 in 100-year rainfall event (including an allowance of 30% for the effects of future climate change), as defined in NPPF Technical Guidance.

6.3 Foul Water Drainage

The proposed foul water discharge has been calculated for both phases and is detailed below:

- Phase 2 foul water discharge – 16.80 l/s (design flow 6xDWF+10%).
- Phase 3 foul water discharge – 6.00 l/s (design flow 6xDWF+10%).

Calculation have been carried out using the method as detailed in SFA.

Foul Water drainage calculations are in Appendix G.

Discharge from both sites is proposed to drain into the existing 150 diameter public foul water sewer located in phase 3 land.

Discharge from Phase 3 will be directly into the public sewer at a convenient location to suit the proposed development.

Discharge from Phase 2 would be via a new section of sewer/drain to be constructed from the south to the north of Dearne Valley Parkway.

The pipe would pass beneath Dearne Valley Parkway via a method to be agreed with BMBC Highways. Possibly directional drilling.

This sewer/drain is to be sized to take Phase 2 along with foul water discharge from the Waddington and Gregory developments to the west.

The drain is been designed and precured by Waddingtons as their development will come on line first. Details are to be finalised by Waddingtons.

The proposed drain will be designed to SFA and Yorkshire Water Requirement and have sufficient capacity to serve all three developments.

The drain will be put forward for adoption at such a time that the criteria for adoption is met.

At the time of writing the drainage and flood risk assessment correspondence from YW had not been received. The report will be reviewed and updated as necessary once correspondence has been received from YW who are the local Sewerage/Water Company.

7.0 DRAINAGE MAINTENANCE AND MANAGEMENT

The proposed foul and surface water drainage systems including the detention basin will remain private in the short term.

The following maintenance and management guidance is provided.

7.1 Introduction

Pipe sizes and gradients are designed to be self-cleansing albeit regular maintenance and inspections are required to ensure the long-term efficiency of the systems.

All works should be undertaken by suitably qualified personnel and waste should be treated and removed by an appropriately registered company.

7.2 Drains/Sewers

The main objective of maintenance guidance is to establish procedures to ensure the sewer system functions appropriately in the long term within an environment of fiscal control.

Maintenance includes:

- Local repair or local replacement of damaged pipes or other structures in order to maintain the functioning of the sewer.
- Cleaning and removal of sediments, obstructions etc. to restore hydraulic capacity.
- Jetting/vacuum of sewers to be undertaken as often as necessary to remove silts and/or ordinary debris.
- In the event that any extraordinary issues are encountered during an inspection, further information may be required such as a CCTV survey report.
- Maintenance to be undertaken on a six monthly schedule.

To avoid damaging the pipe, PSI pressures need to be verified before jetting of plastic twin wall sewers. Cleaning of drainage systems may require the temporary sealing of the system and careful collection of the effluent for disposal off site.

7.3 Detention Basin

Regular inspection and maintenance is important for the effective operation of the detention basin. CIRIA's SUDS manual C753 Table 23.1 recommends the following maintenance regime for detention basins:

Maintenance schedule	Required action	Typical Frequency
Regular Maintenance	Remove litter and debris.	Monthly (or as required).
	Cut the grass – public areas.	Monthly (during growing season).
	Cut the meadow grass.	Half yearly (spring, before nesting season, and autumn).
	Inspect marginal and bankside vegetation and remove nuisance plants (first 3 years).	Monthly (at start, then as required).
	Inspect inlets, outlets, bankside, structures, pipework, etc. for evidence of blockage and/or physical damage.	Monthly.
	Inspect water body for signs of poor water quality.	Monthly (May – October).
	Inspect silt accumulation rates in any dry weather channel and in main body of the basin and establish appropriate removal frequencies; undertake contamination testing once some build-up has occurred, to inform management and disposal options.	Half yearly.
	Check any mechanical devices, e.g. flow controls.	Half yearly.
	Hand cut submerged and emergent aquatic plants (at minimum of 0.1m above basin base; include 25% of basin surface).	Annually.
	Remove 25% of bank vegetation from water's edge to a minimum of 1m above water level.	Annually.
	Tidy all dead growth (scrub clearance) before start of growing season (Note: tree maintenance is usually part of overall landscape management contract)	Annually.
	Remove sediment from any dry weather channel.	Every 1-5 years, or as required.
	Remove sediment and planting from one quadrant of the main body of basins.	Every 5 years, or as required.
Occasional maintenance	Remove sediment from the main body of big basins when pool volume is reduced by 20%.	With effective pre- treatment this will only be required rarely, e.g. every 25-50 years.
Remedial actions	Repair erosion or other damage.	As required.
	Replant, where necessary.	As required.
	Repair/rehabilitation of inlets, outlets and overflows.	As required.

This regime can be tailored to suit the detention basin dependant on final landscaping details and many of the maintenance activities may be undertaken as landscaping maintenance.

7.4 Flow Control Chamber

The surface water drainage network has a discharge restriction imposed by Barnsley MBC; this is controlled by a flow control device.

Regular inspections of the flow control chamber should be carried out to ensure that debris that may obstruct the inlet to the flow control is not present. The frequency of inspection will depend on the location of the unit, it is recommended initial inspections should be on a three-month basis for the first year of operation followed by a six-monthly basis thereafter.

In the event that the inlet to the control unit becomes blocked, the pivoting bypass door may be operated by pulling the wire rope attached upwards to drain down the chamber and provide access for maintenance.

7.5 Manholes/Access Chambers

All manhole covers should be lifted, and the manholes visually inspected for silt, debris and signs of blockages within the drainage system. Check manhole covers and frames for damage and ensure correctly bolted together. This should be undertaken on a six monthly basis.

Should any debris or blockages be detected, the manholes should be cleaned along with associated pipe runs which should be high pressure jetted and CCTV surveyed to verify/identify that no further remedial works are required.

8.0 CONCLUSIONS

This assessment has looked at the drainage and flood risk issues to support a proposed commercial development on land adjacent to Dearne Valley Parkway.

The site lies within Flood Zone 1 and is therefore at low risk of flooding from river or sea. NPPF Technical Guidance states all uses of land are appropriate in Flood Zone 1.

Other sources of flooding have been assessed and the risk of flooding from these sources is considered to be low.

Surface water shall discharge to tributary of the downstream watercourse known as Short Wood Dike which passes through the west of the site.

Discharge from both phases will be restricted to greenfield run off rate as detailed in the report.

Surface water attenuation will be provided in a detention basin located to the west of the phase 2 development and to the north of the phase 3 development.

Foul water drainage will discharge to the existing 150 diameter public foul water sewer located in phase 3 land subject to agreement by YW.

Jonathan Millar
For and behalf of JPG (Leeds) Limited

December 2019

Appendix A Site Location Plan

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DO NOT SCALE

NOTES

GENERAL NOTES

1. ALL MATERIALS AND WORKMANSHIP IS TO COMPLY WITH JPG CONSULTANTS STANDARD SPECIFICATION & ALL RELEVANT BRITISH & EUROPEAN STANDARDS.
2. THIS DRAWING IS TO BE READ IN CONJUNCTION WITH ALL RELEVANT ARCHITECTS, M & E CONSULTANTS AND JPG CONSULTANTS DRAWINGS.
3. ANY DISCREPANCIES SHOULD BE REPORTED TO THE ENGINEER IMMEDIATELY SO THAT CLARIFICATION CAN BE SOUGHT PRIOR TO COMMENCEMENT OF WORKS.

SITE INFORMATION

SITE ADDRESS
ADDRESS - DEARNE VALLEY PARKWAY
NEAREST POSTCODE - S74 9LH
OS SHEET/TILE - SE354010
OS CO-ORDINATES - E435470, N401042

SITE LOCATION PHASE 2

SITE LOCATION PHASE 3

REV	DESCRIPTION	DATE	BY

Project
ROCKINGHAM PHASES 2 AND 3

Drawing Title
LOCATION PLAN

INFORMATION ISSUE

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JPG Project Ref	Scale at A1	Date	Checked	Drawn
4652-2	1:2500	DEC 2019	JDM	JDM

4652-2 - JPG - SW - 00 - DR - D - 1450 | S2 | P01

Appendix B Topographic Survey



N

Station Information:

Station	Easting (m)	Northing (m)	Level (m)
J3	435882.1325	401329.6624	137.5958
J9	435461.1431	401030.8561	133.7290
J10	435379.0995	400966.2000	133.1627
J11	435297.9100	400902.7972	132.5586
J101	435584.3756	401567.5944	115.8042
J102	435740.2869	401523.5149	125.2937
J103	435810.8799	401448.4666	131.4481
R1	435197.5609	400844.8155	132.8223
GH1	435043.1610	400723.1770	134.9460
GH2	435031.6440	400619.6290	137.2870
GH3	435120.3913	400749.6597	134.5070

OS Note:

Some services may have been omitted due to parked vehicles. The Ordnance Survey tile is to be used as a guide only.

OS Buildings *Surveyed Buildings*

This survey has been orientated to the Ordnance Survey (O.S) National Grid (OSGB36) via Global Navational Satellite Systems (GNSS) and the O.S. Active Network (OS Net).

A true OSGB36 coordinate has been established near to the site centre via a transformation using the OSTN02 & OSGM02 transformation models.
The survey has been correlated to this point and a further one or more OSGB36 points established to create a true O.S. bearing for angle orientation.

No scale factor has been applied to the survey therefore the coordinates shown are arbitrary & not true O.S. Coordinates which have a scale factor applied.

Please refer to Survey Station Table to enable establishment of the on-site grid and datum.

Legend:

Buildings; Wall; Kerb line; Line marking; Cross kerb; Grass bank; Cutting top; Cutting bottom; Overhead Cable; Concrete edge; Grass verge; Canopy/Overhang; Hedge; Station and Name; 100.000 Station Level; Tree / Bush / Sapling; Area of Undergrowth; Woodland; R Ridge Level; E Eaves Level; F Flat Roof Level; Gate

Fence types: HW Interwoven; IRN Iron Railings; WM Wire Mesh; PR Post & Rail; PW Post & Wire; CL Chain Link; WDP Wooden Panels; CCP Concrete Panels; SP Steel Palisade

IC	Inspection chamber	Bol	Bollard		
Priv	Pipe invert	IB	Illuminated bollard		
Gy	Gully	Bin	Rubbish bin		
Bg	Back gully	Vp	Vent pipe		
Dp	Down pipe	GH	Ground light		
Pipe	Pipe above ground	Lbox	Letter box		
MH	Manhole	Ldr	Ladder		
WL	Water level	Stp	Stile		
Fl	Flood light	IFL	Internal floor level		
Lp	Lamp post	THL	Threshold level		
Tg	Telegraph post	Sp	Sign post		
Ep	Electricity post	TH	Trailhole		
Tl	Traffic light	BH	Borehole		
Bus	Bus stop	ELC	Electric		
Sv	Stop valve	BT	British Telecom		
St	Stop tap	CTele	Control box		
Er	Earth rod	TT	Tactile		
Wm	Water meter	BP	Brick paved		
Gas	Gas valve	CPS	Concrete paving slabs		
Av	Air valve	CVR	Cover		
ICU	Unidentified inspection	IC	Invert level **Set out plans** added		
Wo	Wash out	RWall	Retaining wall		
Re	Rodding eye	UTL	Unable to lift		
BB	Belisha beacon	TCL	Tree canopy level		
CTV	Cable tv	G	Girth		
Mkr	Marker post	MG	Multi girth		
GMkr	Gas marker post	Stmp	Tree Stump		
Su	Soffit	CL	Cover level		
			Invert level		

Rev	Date	Description	Drawn	O. Ref
6	22.11.19	Proposed Road Surveyed.	MT	GH6351
5	01.02.19	Set Out Points Added	JT	GH4278
4	11.01.19	Survey Extension Plot 2	JT	GH4278
3	20.07.17	Survey Extension	JC	C1489
2	Sept 14	All phases surveyed. Site grid updated.	BG	C1191

greenhatch group

- Topographical Surveys
- Site Engineering
- Utility / CCTV Surveys
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CLIENT
Harworth Estates Ltd

PROJECT
Rockingham
Dearne Valley Parkway
Birdwell

TITLE
Topographical Survey

SCALE	DATE
A1@ 1: 2000	05-06.06.14
DRAWN: LP	QUALITY REF: A1042

Level datum	See OS Note
Grid orientation	See OS Note
Job number	20379

Drawing No. 20379_OGL Rev. 6

Comments
This plan should only be used for its original purpose. Greenhatch Group accepts no responsibility for this plan if supplied to any party other than the original client.

All dimensions should be checked on site prior to design and construction.

Drainage information (where applicable) has been visually inspected from the surface and therefore should be treated as approximate only.

Notes:

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Appendix C Yorkshire Water Sewer Records


A 6195
Path
Track
Drain
Upper Hoyland
Hoyland Lowe
Hoyland Stand
Reservoir (covered)
Tank
Graveyard
Cemetery
Playing Field
Nursing Home
Lighting Towers
Hampton House
Kirk Balk Community College
Leisure Centre
West Meadows Primary School
School House
Kirk View
Allotment Gardens
HOYLAND COMMON
King George's Field (recreation ground)
Juice Station
Shelter
Pole
El Sub Sta
WEST STREET
BANKVIEW ROAD
MOUNT CRESCENT
CORONATION ROAD
CORONATION CRESCENT
CORONATION AVENUE
HAMPTON AVENUE
HAMPTON CRESCENT
HAMPTON ROAD
WOODLAND AVENUE
WOODLAND CRESCENT
WOODLAND ROAD
WOODLAND GROVE
WOODLAND DRIVE
WOODLAND VIEW
WOODLAND GARTH
WOODLAND CLOSE
WOODLAND MOUNT
WOODLAND RISE
WOODLAND WAY
WOODLAND PARK
WOODLAND GLADE
WOODLAND MEWS
WOODLAND COURT
WOODLAND PLACE
WOODLAND ROAD
WOODLAND GROVE
WOODLAND DRIVE
WOODLAND VIEW
WOODLAND GARTH
WOODLAND CLOSE
WOODLAND MOUNT
WOODLAND RISE
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