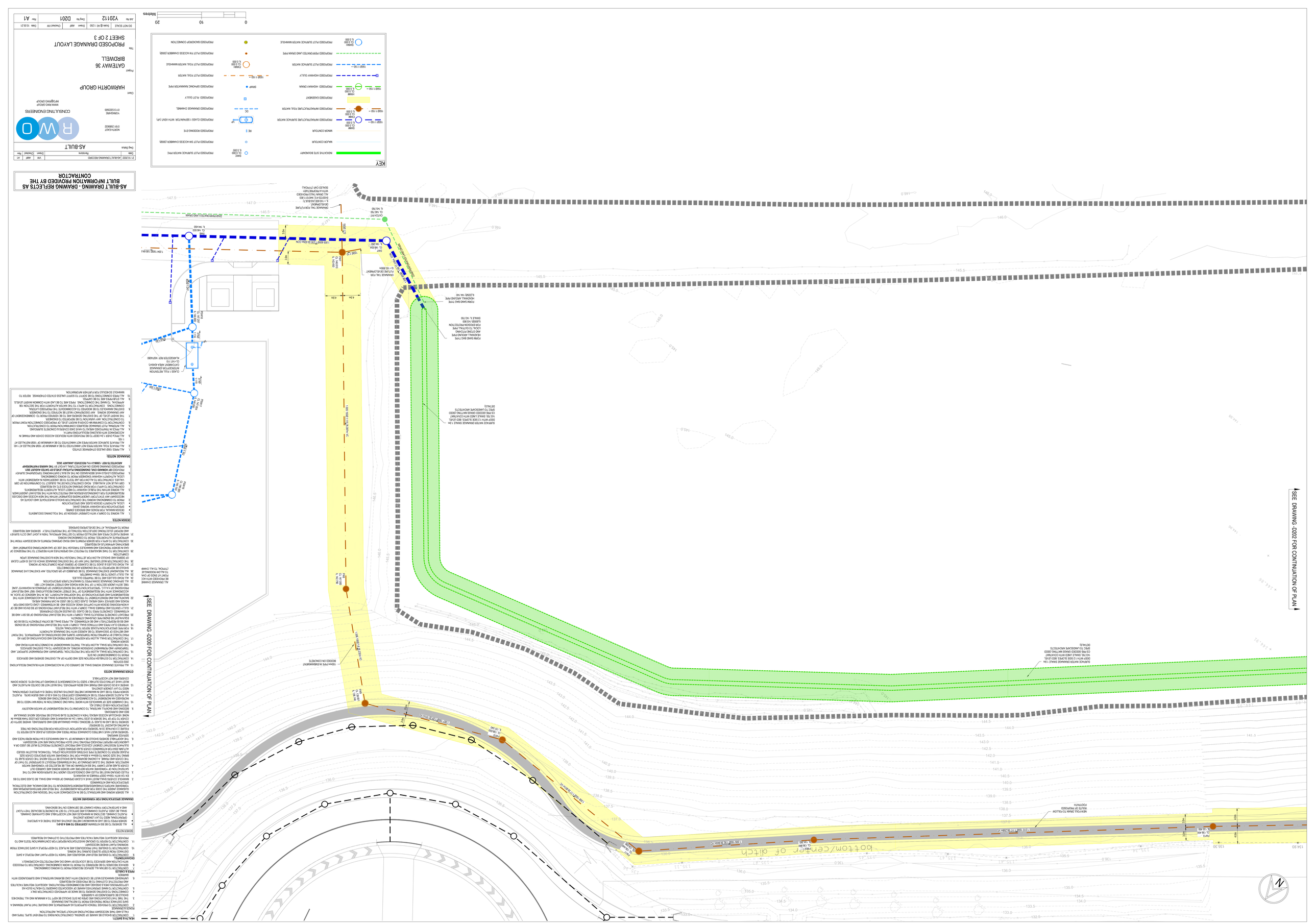

HEALTH & SAFETY:

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

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

Dwg Status AS-BUILT

RWO
CONSULTING ENGINEERS

NORTH EAST
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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

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 AND WILL BE RECTIFIED BY YORKSHIRE WATER/THEIR AGENTS IF ANY ROCKING IS EVIDENT OF THE COVER SLAB MOVEMENT 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 (CEM.II/C2) 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. TRENCH BACKFILL MATERIAL TO CONFORM TO THE REQUIREMENT OF WATER INDUSTRY SPECIFICATION W/H-03 (TABLE 4D).
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 BSEN1376). 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 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 AND BE KITEMARKED. LOAD CLASS SHALL BE AS NOTED ON DRAWINGS. CLASS D400 FOR CARRIAGEWAYS AND CLASS B125 FOR AREAS SUBJECT TO AUTOMOBILE TRAFFIC ONLY.
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 MANUFACTURERS 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 METHANE FROM 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. BEFORE COMMENCING EXCAVATION, 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: 13066-3-11U 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.
3. ALL PRIVATE SURFACE WATER PIPES NOT ANNOTATED TO BE A MINIMUM OF 100Ø INSTALLED AT 1:80.
4. ALL PPCs OVER 1.2m DEEP TO BE PROVIDED WITH REDUCED ACCESS COVER AND FRAME IN ACCORDANCE WITH BUILDING REGULATIONS PART H.
5. ALL PPCS IN TRAFFICKED AREAS TO HAVE D400 COVERS & CONCRETE SURROUND.
6. ALL INTERNAL PLOT DRAINAGE REQUIRES CONFIRMATION PRIOR TO CONSTRUCTION.
7. CONTRACTOR TO CONFIRM RH 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. 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.
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 PPIC
MAJOR CONTOUR	PROPOSED PLOT SW ACCESS CHAMBER (300Ø)
MINOR CONTOUR	PROPOSED RODDING EYE
PROPOSED INFRASTRUCTURE SURFACE WATER	PROPOSED CLASS 1 SEPARATOR WITH 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

RWO CONSULTING ENGINEERS
NORTH EAST 0191 2586632
YORKSHIRE 0113 5323500
WWW.RWO.GROUP
INFO@RWO.GROUP

Client: HARWORTH GROUP

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

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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LS12 6QA

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CONTENTS

APPENDICES

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

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

Architect
THE HARRIS PARTNERSHIP

JPG
www.jpg.group
Leeds London Birmingham 0113 263 1155

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
Edge of road
Drop kerb
Centre line
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
WP Wooden Panels
CP Concrete Panels
SP Steel Palisade

IC	Inspection chamber	Bol	Bollard
Pinv	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	Litter	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	Ctrol	Control box
Er	Earth rod	TT	Tactile
Wm	Water meter	BP	Brick paved
Gav	Gas valve	CPS	Concrete paving slabs
Av	Air valve	CVR	Cover
ICU	Unidentified inspection	IC	Invert **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
- Measured Building Surveys
- 3D Laser Scanning
- Revit & BIM Models

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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	QUALITY REF
LP	A1042

Level datum	See OS Note
Grid orientation	See OS Note
Job number	20379
Drawing No.	Rev.
20379_OGL	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:

Appendix C Yorkshire Water Sewer Records