APPENDIX 11.1

Drainage Strategy for:

Residential Development, Herbert Road, Newport

Steve Morgan Associates

Consulting Civil & Structural Engineers
9 Clytha Park Road
Newport
NP20 4PB

Tel: 01633 266244
e: engineers@smalimited.co.uk

CLIENT: **POBL Group**

PROJECT: **Herbert Road, Newport**

TITLE: **Drainage Strategy**

JOB NO: **1176242**

DOCUMENT REF: **1176242 - DS**

Revision: **C**

Revision	Purpose	Written	Approved	Date
C	Information	TDJ	SRM	13/03/18
B	Information	TDJ	SRM	20/11/17
A	Revised Layout	TDJ	SRM	17/11/17
--	Information	TDJ	SRM	31/07/17

Signed .....

S R Morgan B.Eng (Hons) C.Eng. M.I.C.E.

Signed .....

T D Jayne B.Eng (Hons)

CONTENTS

APPENDICES

1.0 INTRODUCTION

Steve Morgan Associates Limited (SMA) were appointed by Pobl Group to design and detail a below ground drainage system for the proposed redevelopment at Herbert Road, Newport.

The purpose of this report is to present the drainage strategy behind the current & future drainage design.

2.0 DESCRIPTION OF EXISTING SITE

The site is located at:
Land To South Of Glan Usk Primary School
Herbert Road
Newport

The National Grid Reference for the site is ST 31608 88970 (E 331608 N 188970).
A site plan is included within Appendix A. It is bounded to the west by the river Usk, and to east by the residential properties off Courtney Street & Morgan Street, the industrial area off Herbert Road & Crawford Street and the Welsh Marches Railway line.

As part of the development, the site is being raised.

The site is currently vacant, with known historical industrial use.

3.0 DESCRIPTION OF PROPOSED DEVELOPMENT

Subject to approval of planning permission(s), the site is to be occupied by a large residential development. The Phase 1 works (currently under construction) consists of;

- construction of the site access road, approx. 450m to be adopted by the local authority, Newport Highways Department
- construction of three apartment blocks
- enlargement of the existing reen/drainage channel
- construction of SW outfall to lower reen section (highways adopted).

Phases 2, 3 & 4;

- construction of 206 residential units; a mix of apartment buildings, terraced, semi-detached & detached dwellings.
- construction of highway adopted roads off the Phase 1 access road & private courtyards/cul-de-sac.
- construction of SW outfalls (mix of Highways & DCWW adopted).

4.0 DRAINAGE STRATEGY

The site has been surveyed extensively with CCTV & topographical surveys. The following drainage services have been noted:-

a) FW sewer adjacent to site entrance/Courtney Street flowing north as far as MHE4. (Refer to Appendix B, *DCWW drawing PLA0008910 & NE0825/C103*) Flows are then connected to a larger trunk sewer, heading westwards beneath the River Usk. There are two existing outfalls detailed;
    i) *Riverside Outfall,* south west of the site entrance.
    ii) *Cenotaph North Outfall,* west of the TS Resolute (Newport Sea Cadets Corp). This serves the intersecting historic egg-shaped masonry sewer and a DN900 concrete sewer running in parallel. The outfall is currently covered by the river bank. Based upon invert depths, it does not appear to directly serve the main sewer.

b) SW culvert, passing beneath the railway line & entering the site on the eastern boundary. This discharges to an existing drainage channel/reen, flowing east to west, beneath the existing footbridge before discharging via an outfall into the Usk

c) FW sewer on site eastern boundary, flowing south to north to the north-eastern boundary/corner.

d) Following on from consultation with DCWW, existing easements for DCWW sewers have been compiled and shown on drawing 1176242 – DCWW 01.

4.1 PROPOSED DRAINAGE SYSTEM

4.1.1 FOUL WATER

PHASE 1;

FW flows from the apartment blocks will drain into the existing 150mm Ø sewer adjacent to TS Resolute. A new MH will need to be formed over the sewer. This is subject to an S104 agreement with DCWW. Refer to drawing SMA 1155090 - S104

PHASES 2, 3 & 4

Due to the scale of the site, FW flows are to be split to two discharge points north & south of the reen; MH B2 (ST31897302) & MH D (ST31897506). Refer to drawing 1176242 - 002 FW.

Proposed plots along the Phase 1 access road are to connect to the 150mmØ sewer as per other plots in Phase 1.

4.1.2 SURFACE WATER

Current guidance from SuDs Wales indicates the following surface water disposal options should be considered (listed in reverse order of preference):

I. Disposal to off-site sewer;
II. Disposal to off-site watercourse;
III. Disposal via on-site infiltration systems (Sustainable Urban Drainage);

While current regulatory thinking/good practice encourages the use of sustainable drainage techniques, such as infiltration systems (soak-aways), these systems have a maintenance liability not normally associated with traditional, piped disposal systems and require sufficient and/or suitable competence of workings for their entire life span.

SURFACE WATER (Cont…)

Any soakaways or infiltration systems installed for the site must therefore be regularly maintained to ensure adequate sustainable drainage of effluent and to aid the prevention of flooding. Should any area on the site be made available to locate an infiltration drainage system for the surface water, it is unlikely that the ground conditions would prove suitable. Parts of the site are known to have contaminated soils (refer to '*terrafirma Geotechnical & Geo-environmental Site Investigation Report Phase 1*').

Subject to approval from the Local Authority Highways Department & DCWW, the existing reen is to be enlarged, allowing additional capacity for SW flows from the fully-developed site (refer to Appendix A; *SMA drawing 1155090 - 550B Reen & 1176242 - 001 SW*). A Highways adopted SW pipe is proposed for the length of the access road, serving the proposed 3 apartment blocks and allowances for future phase development. It is to discharge to the lower-reen section, west of the footbridge. Proportions of the site SW drainage have been split between DCWW & Highways adoption. In total 2no. Highways adopted & 2no. DCWW adopted outfalls are proposed to drain to the reen. Each discharge point is to pass through a Class 1 petrol/oil interceptor before discharging to the reen.

Adjacent to the site entrance, a section of the proposed highway is to drain to the Usk via a new outfall. The system has been designed to have sufficient capacity during for a tidal lock scenario, and pass through a Class 1 petrol/oil interceptor before discharging to the Usk.

APPENDIX A -

SMA drawings 1176242 - 001 SW D, 1176242 - 002 FW C, 1176242 - DCWW 01

1155090 - S104, 155090 - 520, 521 & 522

FUTURE PHASE SW SEWERS DISCHARGING TO REEN

SW sewer & outfall/s
Road gully to SW Sewer
Linear Drainage Section
Reen extent
Highways SW sewer & outfall (under construction)
Site Boundary

ALL MH/ICs SHOWN ARE TO BE ADOPTED BY DCWW (SUBJECT TO S104 AGREEMENT) AND/OR LOCAL AUTHORITY.
A MINIMUM OF 3no. PRIVATE ICs SHOULD BE PROVIDED PER UNIT TO ENSURE ADEQUATE CONNECTION/S TO PROPOSED SW SEWER.

FOR MH SCHEDULE & NOTES REFER TO 1176242 - 497 & 498

FOR TENDER PURPOSES ONLY!
NOT FOR CONSTRUCTION

Scales 1:500@A1

STEVE MORGAN ASSOCIATES
CONSULTING ENGINEERS
9 Clytha Park Road Newport NP20 4PB
tel: 01633 266244 fax: 01633 266275
e-mail: engineers@smalimited.co.uk Web: smalimited.co.uk

Project Number 1176242

Drawing Number 001

Rev. D

ALL MH/ICs SHOWN ARE TO BE ADOPTED BY DCWW SUBJECT TO S104 AGREEMENT.
A MINIMUM OF 3no. PRIVATE ICs SHOULD BE PROVIDED PER UNIT TO ENSURE ADEQUATE CONNECTION/S TO PROPOSED PUBLIC SEWER.

FOR MH SCHEDULE & NOTES REFER TO 1176242 - 499

FOR TENDER PURPOSES ONLY!
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Scales 1:500@A1

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Project Number	1176242
Drawing Number	002 FW
Rev	C

MH E4A

MH E4

MH E4C

MH E4D

750mmø

1200mmø

2100mmø

Works

HEBBERT ROAD

El Sub Sta

Path

Mud

Mean High Water

River Usk
(Afon Wysg)

Co Const. Asly Const. & ED Bdy

Outfall

(Newport Sea Cadet Corps)

NORTH

EASEMENTS:- 4m EITHER SIDE OF 750mm Ø CONC DCWW SEWER CENTRELINE
6m EITHER SIDE OF 1200mm Ø CONC DCWW SEWER CENTRELINE

NOTE:- SEWER POSITIONS TAKEN FROM TOPOGRAPHICAL SURVEY/S AND/OR CO-ORDINATES PROVIDED BY THE CLIENT ON SITE. EXISTING EASEMENTS SHOWN TAKEN FROM DCWW PPA2802 CORRESPONDENCE AND PREVIOUS CONSULTATION WITH DCWW. ADDITIONAL LOCATIONS TAKEN FROM HYDER CONSULTING NE0825/C103.

FOR SW & FW LAYOUTS REFER TO 1176242 - 001 SW & 002 FW

FOR MH SCHEDULE & NOTES REFER TO 1176242 - 497 & 498

FOR TENDER PURPOSES ONLY!
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Scales 1:600@A1

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9 Clytha Park Road Newport NP20 4PB
tel: 01633 266244 fax: 01633 266275
e-mail: engineers@smalimited.co.uk Web: smalimited.co.uk

Project Number 1176242

Drawing Number DCWW-01 Rev --

SECTION 104 NOTES:-

1. EXISTING SEWER LAYOUT TAKEN FROM TOPOGRAPHICAL SURVEY PROVIDED BY CLIENT; ALL SEWER/MH POSITIONS, SIZES, LEVELS AND/OR CONSTRUCTION DETAILS TO BE CONFIRMED ON SITE PRIOR TO THE COMMENCEMENT OF WORKS AND/OR ORDERING OF MATERIALS.
2. ALL RWPs TO BE FITTED WITH RODDABLE GULLIES AT JUNCTURE W/T GROUND.
3. MINIMUM BELOW GROUND PIPE Ø 100mm.
4. MINIMUM DEPTH OF COVER (FROM GL TO CROWN OF PIPE) TO BE >1.2m IN ALL AREAS ACCESSIBLE TO VEHICLES.
5. ALL WORKS TO CONFORM TO BUILDING REGULATIONS 2010 ed.
6. ALL CHAMBERS TO BE FITTED WITH ROCKER PIPES AND IN ACCORDANCE WITH DCWW SPECIFICATION.
7. ALL REMEDIATION WORKS TO THE SEWERS ARE TO BE INDUSTRY RECOGNISED CONTRACTOR QUALIFIED TO WORK ON LIVE EFFLUENT.
8. THE SYSTEM WILL REQUIRE INSPECTION AND TESTING PRIOR TO THE CONCRETE SURROUND BEING LAID AND A FULL CAMERA SURVEY TO BE CARRIED OUT PRIOR TO BACKFILLING THE TRENCHES.
9. THE DEVELOPER MUST SELF-VET AND CERTIFY THAT THE DESIGN CRITERIA, MATERIAL STANDARDS AND WORKMANSHIP SPECIFICATIONS FOR THE PROPOSED DIVERTED SEWERS ARE IN ACCORDANCE WITH THOSE SET OUT IN "SEWERS FOR ADOPTION" 7TH EDITION, THE WELSH MINISTERS STANDARDS AND THE REQUIREMENTS OF US (DCWW) AS THE STATUTORY SEWERAGE UNDERTAKER.
10. A SECTION 106 APPLICATION TO CONNECT MUST BE MADE TO DCWW, THE DEVELOPER SHALL GIVE 21 DAYS' NOTICE PRIOR TO CONNECTION AND THE WORKS MUST BE UNDERTAKEN BY A SSIP ACCREDITED CONTRACTOR.

NOTE REGARDING GRADIENTS OF FOUL SEWERS:-

AS TO SFA 7th ed. *B4 RELIABILITY pt 9;*

WHERE THE DESIGN FLOW IS LESS THAN 0.75m/s AT ONE THIRD DESIGN FLOW, THE SELF CLEANSING CRITERION WOULD BE CONSIDERED TO BE SATISFIED IF:

a) A 150mm NOMINAL INTERNAL DIAMETER GRAVITY SEWER IS LAID TO GRADIENT NOT FLATTER THAN 1:150 WHERE THERE ARE AT LEAST TEN DWELLINGS UNITS CONNECTED; OR
b) A SEWER OR LATERAL DRAIN WITH A NOMINAL INTERNAL DIAMETER OF 100mm, OR A LATERAL DRAIN SERVING TEN OR LESS PROPERTIES IS LAID TO A GRADIENT NOT FLATTER THAN 1:80, WHERE THERE IS AT LEAST ONE WC CONNECTED AND 1:40 IF THERE IS NO WC CONNECTED.

DRAINAGE NOTES:-

1. MANHOLE COVERS AND FRAMES TO BS EN 124
   GROUP 4 - HIGHWAY CLASS (D400)
   GROUP 2 - CAR PARKING AREAS (CLASS B125)
   GROUP 1 - SOFT LANDSCAPING AND FOOTWAYS (CLASS A15)
2. PIPE MATERIAL; MATERIAL AS SPECIFICATION
3. CONNECTIONS TO BE UNDERTAKEN SUBJECT TO THE PROVISION OF SECTION 106 OF THE WATER INDUSTRY ACT 1991 TO **SEWERAGE UNDERTAKERS APPROVAL**.
4. ALL EXISTING MANHOLE INVERTS TO BE CHECKED AND REPORTED TO THE ENGINEER PRIOR TO THE COMMENCEMENT OF DRAINAGE WORKS. EXISTING PIPE CONNECTIONS ARE TO BE CCTV SURVEYED AND INSPECTED BY THE ENGINEER AND LOCAL AUTHORITY. IF THE PIPE CONNECTION IS FOUND TO BE DAMAGED OR IN DISTRESS, THE CONTRACTOR IS TO CARRY OUT REMEDIAL WORKS OR PROVIDE A NEW CONNECTION TO THE EXISTING SEWER (PIPE SIZE AND GRADIENT TO BE DETERMINED BY THE ENGINEER.) THE GRADIENTS INDICATED AGAINST THE DRAIN RUNS ARE APPROXIMATE ONLY.
5. THE CONTRACTOR SHALL INSTALL DRAINS TO THE INVERT LEVELS SHOWN FOR EACH MANHOLE OR OTHER INDICATED POSITION. THIS DRAWING TO BE READ IN CONJUNCTION WITH ALL RELEVANT ARCHITECTS, ENGINEERS AND SPECIALISTS LATEST DRAWINGS, TOGETHER WITH THE LATEST SPECIFICATION. ANY DISCREPANCIES ARE TO BE REPORTED TO THE ENGINEER AS SOON AS POSSIBLE.

   ABANDONMENT OF SEWERS

7. ALL REMEDIATION WORKS TO THE SEWERS ARE TO BE INDUSTRY RECOGNISED CONTRACTOR QUALIFIED TO WORK ON LIVE EFFLUENT.
8. NO SEWER SHALL BE ABANDONED UNTIL THE CONTRACTOR HAS CONFIRMED THAT THERE ARE NO LIVE CONNECTIONS REMAINING.
9. NO CONSTRUCTION WORKS SHALL COMMENCE OVER OR WITHIN 6.0m OF ANY SEWER THAT IS TO BE ABANDONED UNTIL THAT SEWER HAS BEEN FILLED AND SEALED AS SPECIFIED IN THE TABLE TO THE SATISFACTION OF THE ENGINEER.
10. THE CONTRACTOR WILL BE HELD RESPONSIBLE FOR THE COST OF REMOVING ANY GROUT THAT HAS ACCIDENTALLY OR OTHERWISE AFFECTED ANY SEWER/DRAIN THAT IS NOT TO BE ABANDONED.
11. ENDS OF SEWERS SHALL BE SEALED WITH 225mm THICK. BRICKWORK WALLS WITH SUITABLE PIPE CONNECTIONS. FOR GROUT INJECTION; SACRIFICIAL STOPPERS MAY BE USED ON SMALL DIAMETER SEWERS.
12. SEWERS/DRAINS LESS THAN 1.0m MAY BE SCRUBBED UP AND REMOVED
13. ALL PIPES TO BE LAID TO THE INVERTS SHOWN. PIPES TO BE LAID SOFFIT TO SOFFIT.
14. PIPE ALTERNATIVES:
    - VERIFIED CLAY PIPE CLASS 5S (36 KNM)
    - PRE CAST CONCRETE PIPE CLASS H
    - uPVC ULTRARIB OR POLYPIPE POLYSEWER UP TO 300mmØ

    A CONTRACTOR WHO IS ACCREDITED TO THE BRITISH PLASTICS FEDERATION - PLASTIC PIPES GROUP MUST UNDERTAKE THE INSTALLATION OF STRUCTURAL WALL PLASTIC PIPES.
15. BEDDING CLASSIFICATION;
    - CLASS S FOR PIPES WITH 1.2m OR GREATER
    - CLASS B FOR PIPES WITH LESS THAN 1.2m COVER
16. CEMENT GROUTS;
    - CEMENT GROUT FOR FILLING DRAINS WHICH ARE TO BE ABANDONED SHALL BE MIXED IN THE RELEVANT PROPORTIONS INDICATED IN THE FOLLOWING TABLE, USING THE MINIMUM QUANTITY OF WATER TO ENSURE THE NECESSARY FLUIDITY AND TO RENDER IT CAPABLE OF PENETRATING THE WORK.

CLASS	NOMINAL MIX BY MASS		
	CEMENT	SAND	PFA
G3	1	10	–
G4	1	–	10

CEMENT GROUT SHALL BE USED WITHIN 1 HOUR OF MIXING SULPHATE-RESISTING CEMENT SHALL NOT BE USED AS A CONSTITUENT OF GROUPS CONTAINING PFA
CEMENT GROUT FOR THE FIXING INSERTS AND BELOW PLANT BASES SHALL INCLUDE EITHER AN EXANDING OR NON-SHRINK ADDITIVE.

NOTE:-

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LEGEND

- SITE BOUNDARY
- PROPOSED FOUL SEWER
- PROPOSED FOUL LATERAL
- PROPOSED PRIVATE FOUL DRAIN
- EXISTING DCWW SEWER
- AREA OF SEWERS REQUIRING PROTECTION (E.G. CONCRETE HAUNCHING) FROM VEHICLE LOADING; MIN DEPTH TO CROWN OF PIPE >1.2m
- PROPOSED EASEMENTS
- TYPE 4, uPVC/HDPE FLEXIBLE CHAMBER
- TYPE 3, 450 Ø uPVC/HDPE FLEXIBLE CHAMBER
- EXISTING CHAMBERS

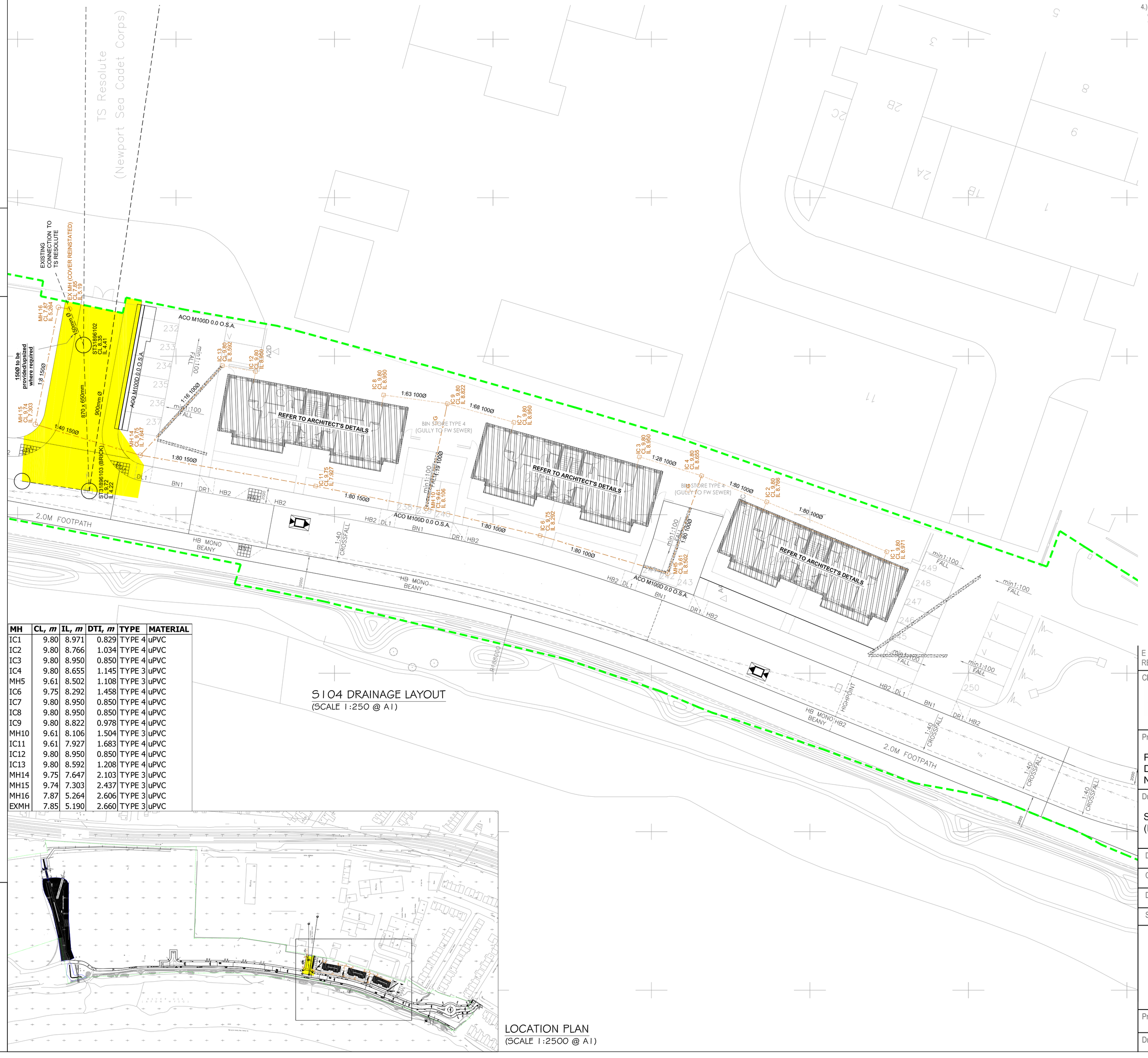
General Notes :

1.) Do not scale from this drawing.

2.) All dimensions are in millimetres.

3.) All levels are in metres relative to datum.

4.) All dimensions stated are to be confirmed on site prior to commencement of any works and any discrepencies found are to be reported to **S**teve **M**organ **A**ssociates **L**imited immediately.



S104 DRAINAGE LAYOUT
(SCALE 1:250 @ A1)

MH	CL, *m*	IL, *m*	DTI, *m*	TYPE	MATERIAL
IC1	9.80	8.971	0.829	TYPE 4	uPVC
IC2	9.80	8.766	1.034	TYPE 4	uPVC
IC3	9.80	8.950	0.850	TYPE 4	uPVC
IC4	9.80	8.655	1.145	TYPE 3	uPVC
MH5	9.61	8.502	1.108	TYPE 3	uPVC
IC6	9.75	8.292	1.458	TYPE 4	uPVC
IC7	9.80	8.950	0.850	TYPE 4	uPVC
IC8	9.80	8.950	0.850	TYPE 4	uPVC
IC9	9.80	8.822	0.978	TYPE 4	uPVC
MH10	9.61	8.106	1.504	TYPE 3	uPVC
IC11	9.61	7.927	1.683	TYPE 4	uPVC
IC12	9.80	8.950	0.850	TYPE 4	uPVC
IC13	9.80	8.592	1.208	TYPE 4	uPVC
MH14	9.75	7.647	2.103	TYPE 3	uPVC
MH15	9.74	7.303	2.437	TYPE 3	uPVC
MH16	7.87	5.264	2.606	TYPE 3	uPVC
EXMH	7.85	5.190	2.660	TYPE 3	uPVC

LOCATION PLAN
(SCALE 1:2500 @ A1)

REV.	By	Date	Description
E	TDJ	07/08/17	Plot levels revised.

Client: Keepmoat

Project Description: PROPOSED HOUSING DEVELOPMENT, HERBERT ROAD NEWPORT

Drawing Title: S104 DRAINAGE LAYOUT (PHASE 1)

Drawn TDJ	Date 25/01/16
Checked	Date
Drawing Status S104 APPLICATION	
Scales 1:250 @ A1	

STEVE MORGAN ASSOCIATES
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Project Number 1155090

Drawing Number S104 Rev.E

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PSW IC2	9.80	9.25	0.55	TYPE 4	uPVC
PSW IC3	9.80	9.07	0.73	TYPE 4	uPVC
PSW IC4	9.70	7.83	1.87	TYPE 4	uPVC
PSW IC5	9.75	7.95	1.80	TYPE 4	uPVC
PSW IC6	9.75	8.12	1.63	TYPE 4	uPVC
PSW IC7	9.80	9.30	0.50	TYPE 4	uPVC
PSW IC8	9.80	9.25	0.55	TYPE 4	uPVC
PSW IC9	9.80	9.07	0.73	TYPE 4	uPVC
PSW IC10	9.75	8.34	1.41	TYPE 4	uPVC
PSW IC11	9.75	9.02	0.73	TYPE 4	uPVC
PSW IC12	9.75	9.25	0.50	TYPE 4	uPVC
PSW IC13	9.72	7.80	1.92	TYPE 3	uPVC
PSW IC14	9.75	7.95	1.80	TYPE 4	uPVC
PSW IC15	9.75	8.18	1.57	TYPE 4	uPVC
PSW IC16	9.80	8.45	1.35	TYPE 4	uPVC
PSW IC17	9.80	9.11	0.69	TYPE 4	uPVC
PSW IC18	9.80	9.30	0.50	TYPE 4	uPVC

LEGEND

- SITE BOUNDARY
- PROPOSED FOUL SEWER
- PROPOSED FOUL LATERAL
- PROPOSED PRIVATE FOUL DRAIN
- EXISTING DCWW SEWER
- PROPOSED PRIVATE SW DRAINAGE
- PROPOSED HIGHWAYS SW SEWER (ADOPTED)
- AREA OF SEWERS REQUIRING PROTECTION (E.G. CONCRETE HAUNCHING) FROM VEHICLE LOADING; MIN DEPTH TO CROWN OF PIPE >1.2m
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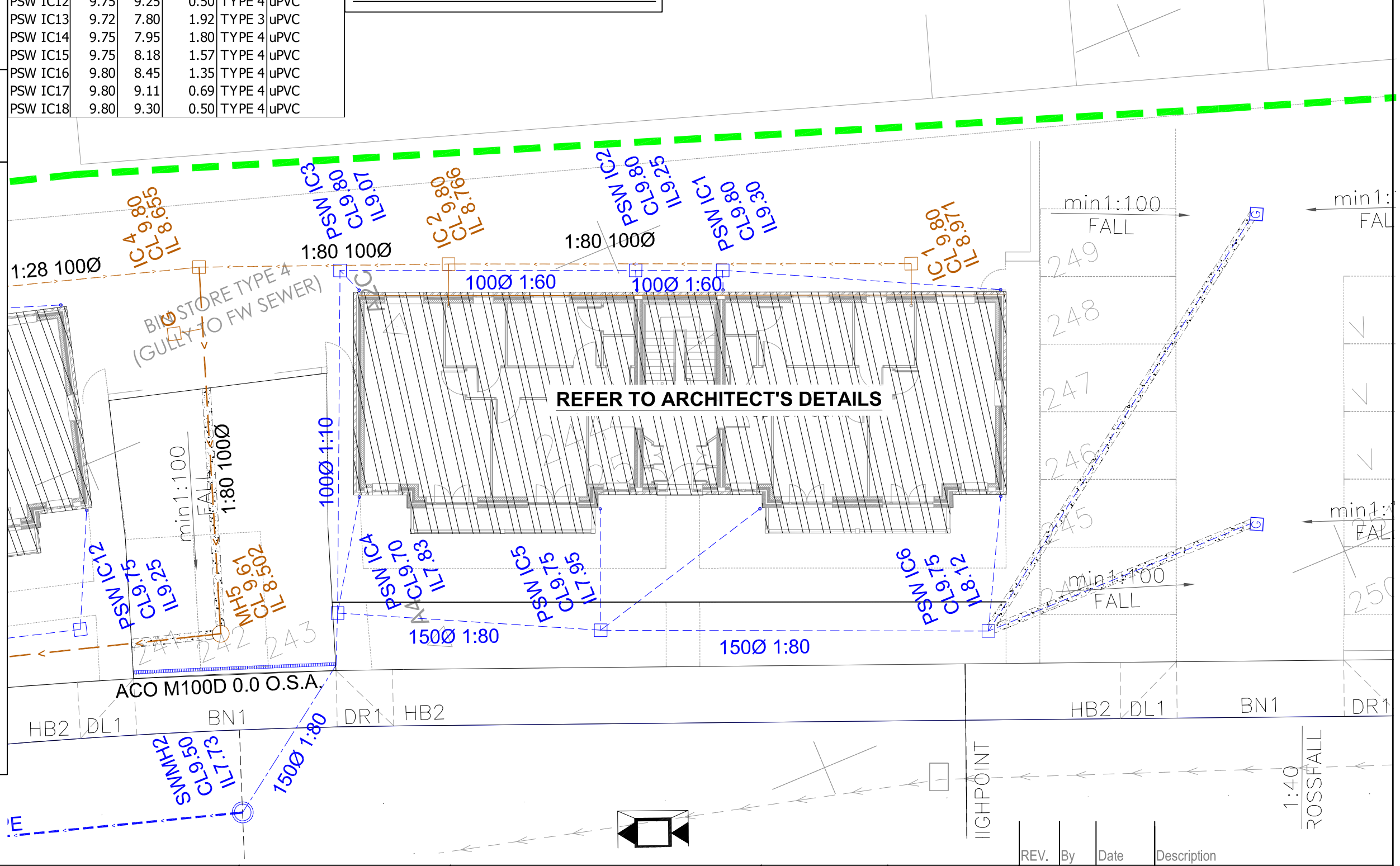
- EXISTING CHAMBERS
- TYPE 4, uPVC/HDPE FLEXIBLE CHAMBER
- TYPE 3, 450 Ø or 600Ø uPVC/HDPE FLEXIBLE or PCC CHAMBER
- TYPE 1, PCC CHAMBER

FOR FOUL IC/MH SCHEDULE, REFER TO DRAWING 1155090-S104



PLOTS 01 - 08, DRAINAGE LAYOUT

(SCALE 1:150 @ A3)

REV.	By	Date	Description

STEVE MORGAN ASSOCIATES
CONSULTING ENGINEERS
9 Clytha Park Road Newport NP20 4PB
tel: 01633 266244 fax: 01633 266275
e-mail: engineers@smalimited.co.uk Web: smalimited.co.uk

Client: Keepmoat

Project Description: PROPOSED HOUSING DEVELOPMENT
HERBERT ROAD
PLOTS 01 - 08, DRAINAGE LAYOUT

Drawn	TDJ	Date	27/07/17	Scales	1:150 @ A3
Checked		Date		Project Number	1155090
Drawing Number	520	Rev.	--		

SECTION 104 NOTES:-

1. EXISTING SEWER LAYOUT TAKEN FROM TOPOGRAPHICAL SURVEY PROVIDED BY CLIENT; ALL SEWER/MH POSITIONS, SIZES, LEVELS AND/OR CONSTRUCTION DETAILS TO BE CONFIRMED ON SITE PRIOR TO THE COMMENCEMENT OF WORKS AND/OR ORDERING OF MATERIALS.
2. ALL RWPs TO BE FITTED WITH RODDABLE GULLIES AT JUNCTURE W/T GROUND.
3. MINIMUM BELOW GROUND PIPE Ø 100mm.
4. MINIMUM DEPTH OF COVER (FROM GL TO CROWN OF PIPE) TO BE >1.2m IN ALL AREAS ACCESSIBLE TO VEHICLES.
5. ALL WORKS TO CONFORM TO BUILDING REGULATIONS 2010 ed.
6. ALL CHAMBERS TO BE FITTED WITH ROCKER PIPES AND IN ACCORDANCE WITH DCWW SPECIFICATION.
7. ALL REMEDIATION WORKS TO THE SEWERS ARE TO BE INDUSTRY RECOGNISED CONTRACTOR QUALIFIED TO WORK ON LIVE EFFLUENT.
8. THE SYSTEM WILL REQUIRE INSPECTION AND TESTING PRIOR TO THE CONCRETE SURROUND BEING LAID AND A FULL CAMERA SURVEY TO BE CARRIED OUT PRIOR TO BACKFILLING THE TRENCHES.
9. THE DEVELOPER MUST SELF-VET AND CERTIFY THAT THE DESIGN CRITERIA, MATERIAL STANDARDS AND WORKMANSHIP SPECIFICATIONS FOR THE PROPOSED DIVERTED SEWERS ARE IN ACCORDANCE WITH THOSE SET OUT IN 'SEWERS FOR ADOPTION' 7TH EDITION, THE WELSH MINISTERS STANDARDS AND THE REQUIREMENTS OF US (DCWW) AS THE STATUTORY SEWERAGE UNDERTAKER.
10. A SECTION 106 APPLICATION TO CONNECT MUST BE MADE TO DCWW, THE DEVELOPER SHALL GIVE 21 DAYS' NOTICE PRIOR TO CONNECTION AND THE WORKS MUST BE UNDERTAKEN BY A SSIP ACCREDITED CONTRACTOR.

NOTE REGARDING GRADIENTS OF FOUL SEWERS:-

AS TO SFA 7th ed. *B4 RELIABILITY pt 9;*

WHERE THE DESIGN FLOW IS LESS THAN 0.75m/s AT ONE THIRD DESIGN FLOW, THE SELF CLEANSING CRITERION WOULD BE CONSIDERED TO BE SATISFIED IF:

a) A 150mm NOMINAL INTERNAL DIAMETER GRAVITY SEWER IS LAID TO GRADIENT NOT FLATTER THAN 1:150 WHERE THERE ARE AT LEAST TEN DWELLINGS UNITS CONNECTED; OR
b) A SEWER OR LATERAL DRAIN WITH A NOMINAL INTERNAL DIAMETER OF 100mm, OR A LATERAL DRAIN SERVING TEN OR LESS PROPERTIES IS LAID TO A GRADIENT NOT FLATTER THAN 1:80, WHERE THERE IS AT LEAST ONE WC CONNECTED AND 1:40 IF THERE IS NO WC CONNECTED.

DRAINAGE NOTES:-

1. MANHOLE COVERS AND FRAMES TO BS EN 124
   GROUP 4 - HIGHWAY CLASS (D400)
   GROUP 2 - CAR PARKING AREAS (CLASS B125)
   GROUP 1 - SOFT LANDSCAPING AND FOOTWAYS (CLASS A15)
2. PIPE MATERIAL: MATERIAL AS SPECIFICATION
3. CONNECTIONS TO BE UNDERTAKEN SUBJECT TO THE PROVISION OF SECTION 106 OF THE WATER INDUSTRY ACT 1991 TO SEWERAGE UNDERTAKERS APPROVAL.
4. ALL EXISTING MANHOLE INVERTS TO BE CHECKED AND REPORTED TO THE ENGINEER PRIOR TO THE COMMENCEMENT OF DRAINAGE WORKS. EXISTING PIPE CONNECTIONS ARE TO BE CCTV SURVEYED AND INSPECTED BY THE ENGINEER AND LOCAL AUTHORITY. IF THE PIPE CONNECTION IS FOUND TO BE DAMAGED OR IN DISTRESS, THE CONTRACTOR IS TO CARRY OUT REMEDIAL WORKS OR PROVIDE A NEW CONNECTION TO THE EXISTING SEWER (PIPE SIZE AND GRADIENT TO BE DETERMINED BY THE ENGINEER.) THE GRADIENTS INDICATED AGAINST THE DRAIN RUNS ARE APPROXIMATE ONLY.
5. THE CONTRACTOR SHALL INSTALL DRAINS TO THE INVERT LEVELS SHOWN FOR EACH MANHOLE OR OTHER INDICATED POSITION. THIS DRAWING TO BE READ IN CONJUNCTION WITH ALL RELEVANT ARCHITECTS, ENGINEERS AND SPECIALISTS LATEST DRAWINGS, TOGETHER WITH THE LATEST SPECIFICATION. ANY DISCREPANCIES ARE TO BE REPORTED TO THE ENGINEER AS SOON AS POSSIBLE.

ABANDONMENT OF SEWERS

7. ALL REMEDIATION WORKS TO THE SEWERS ARE TO BE INDUSTRY RECOGNISED CONTRACTOR QUALIFIED TO WORK ON LIVE EFFLUENT.
8. NO SEWER SHALL BE ABANDONED UNTIL THE CONTRACTOR HAS CONFIRMED THAT THERE ARE NO LIVE CONNECTIONS REMAINING.
9. NO CONSTRUCTION WORKS SHALL COMMENCE OVER OR WITHIN 6.0m OF ANY SEWER THAT IS TO BE ABANDONED UNTIL THAT SEWER HAS BEEN FILLED AND SEALED AS SPECIFIED IN THE TABLE TO THE SATISFACTION OF THE ENGINEER.
10. THE CONTRACTOR WILL BE HELD RESPONSIBLE FOR THE COST OF REMOVING ANY GROUT THAT HAS ACCIDENTALLY OR OTHERWISE AFFECTED ANY SEWER/DRAIN THAT IS NOT TO BE ABANDONED.
11. ENDS OF SEWERS SHALL BE SEALED WITH 225mm THICK BRICKWORK WALLS WITH SUITABLE PIPE CONNECTIONS. FOR GROUT INJECTION; SACRIFICIAL STOPPERS MAY BE USED ON SMALL DIAMETER SEWERS.
12. SEWERS/DRAINS LESS THAN 1.0m MAY BE SCRUBBED UP AND REMOVED
13. ALL PIPES TO BE LAID TO THE INVERTS SHOWN. PIPES TO BE LAID SOFFIT TO SOFFIT.
14. PIPE ALTERNATIVES;
    - VERIFIED CLAY PIPE CLASS S5 (36 KN/M)
    - RKE CAST CONCRETE PIPE CLASS H
    - uPVC ULTRARIB OR POLYPIPE POLYSEWER UP TO 300mmØ

    A CONTRACTOR WHO IS ACCREDITED TO THE BRITISH PLASTICS FEDERATION - PLASTIC PIPES GROUP MUST UNDERTAKE THE INSTALLATION OF STRUCTURAL WALL PLASTIC PIPES.
15. BEDDING CLASSIFICATION;
    - CLASS S FOR PIPES WITH 1.2m OR GREATER
    - CLASS B FOR PIPES WITH LESS THAN 1.2m COVER
16. CEMENT GROUTS;
    - CEMENT GROUT FOR FILLING DRAINS WHICH ARE TO BE ABANDONED SHALL BE MIXED IN THE RELEVANT PROPORTIONS INDICATED IN THE FOLLOWING TABLE, USING THE MINIMUM QUANTITY OF WATER TO ENSURE THE NECESSARY FLUIDITY AND TO RENDER IT CAPABLE OF PENETRATING THE WORK.

CLASS	NOMINAL MIX BY MASS		
	CEMENT	SAND	PFA
G3	1	10	–
G4	1	–	10

CEMENT GROUT SHALL BE USED WITHIN 1 HOUR OF MIXING SULPHATE-RESISTING CEMENT SHALL NOT BE USED AS A CONSTITUENT OF GROUTS CONTAINING PFA
CEMENT GROUT FOR THE FIXING INSERTS AND BELOW PLANT BASES SHALL INCLUDE EITHER AN EXANDING OR NON-SHRINK ADDITIVE.

NOTE:-

PRIOR TO THE COMMENCEMENT OF DRAINAGE WORKS THE CONTRACTOR SHALL VERIFY/DETERMINE THE PRECISE SIZE, LOCATION, DEPTH AND CONDITION OF ALL EXISTING DRAINS, WATERCOURSES, SEWERS, SERVICES AND ANY APPARATUS WITHIN OR ADJACENT TO THE SITE BOUNDARIES WHICH ARE LIKELY TO AFFECT THE WORKS OR BE AFFECTED BY THE WORKS AND PRESENT HIS FINDINGS TO THE ENGINEER.

MH	CL, *m*	IL, *m*	DTI, *m*	TYPE	MATERIAL
PSW IC1	9.80	9.30	0.50	TYPE 4	uPVC
PSW IC2	9.80	9.25	0.55	TYPE 4	uPVC
PSW IC3	9.80	9.07	0.73	TYPE 4	uPVC
PSW IC4	9.70	7.83	1.87	TYPE 4	uPVC
PSW IC5	9.75	7.95	1.80	TYPE 4	uPVC
PSW IC6	9.75	8.12	1.63	TYPE 4	uPVC
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PSW IC8	9.80	9.25	0.55	TYPE 4	uPVC
PSW IC9	9.80	9.07	0.73	TYPE 4	uPVC
PSW IC10	9.75	8.34	1.41	TYPE 4	uPVC
PSW IC11	9.75	9.02	0.73	TYPE 4	uPVC
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PSW IC16	9.80	8.45	1.35	TYPE 4	uPVC
PSW IC17	9.80	9.11	0.69	TYPE 4	uPVC
PSW IC18	9.80	9.30	0.50	TYPE 4	uPVC

LEGEND

- SITE BOUNDARY
- PROPOSED FOUL SEWER
- PROPOSED FOUL LATERAL
- PROPOSED PRIVATE FOUL DRAIN
- EXISTING DCWW SEWER
- PROPOSED PRIVATE SW DRAINAGE
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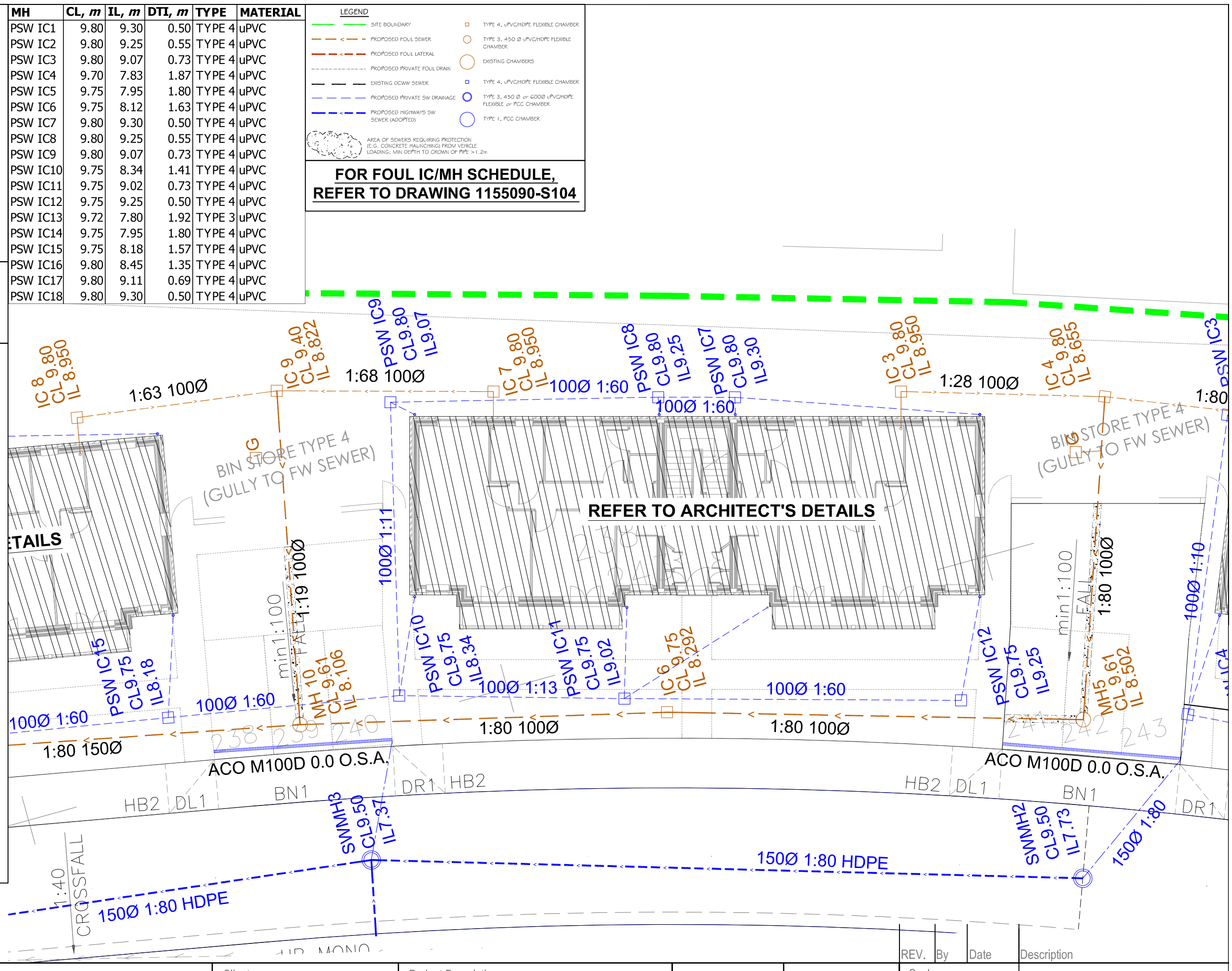
FOR FOUL IC/MH SCHEDULE, REFER TO DRAWING 1155090-S104



PLOTS 09 - 14, DRAINAGE LAYOUT

(SCALE 1:150 @ A3)

REV.	By	Date	Description

STEVE MORGAN ASSOCIATES
CONSULTING ENGINEERS
9 Clytha Park Road Newport NP20 4PB
tel: 01633 266244 fax: 01633 266275
e-mail: engineers@smalimited.co.uk Web: smalimited.co.uk

Client: Keepmoat

Project Description: PROPOSED HOUSING DEVELOPMENT
HERBERT ROAD
PLOTS 9 - 14, DRAINAGE LAYOUT

Drawn	TDJ	Date	27/07/17	Scales	1:150 @ A3
Checked		Date		Drawing Number	521

Project Number 1155090
Rev. --

SECTION 104 NOTES:-

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DRAINAGE NOTES:-

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11. ENDS OF SEWERS SHALL BE SEALED WITH 225mm THICK. BRICKWORK WALLS WITH SUITABLE PIPE CONNECTIONS. FOR GROUT INJECTION; SACRIFICIAL STOPPERS MAY BE USED ON SMALL DIAMETER SEWERS.
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LEGEND

- SITE BOUNDARY
- PROPOSED FOUL SEWER
- PROPOSED FOUL LATERAL
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- EXISTING DCWW SEWER
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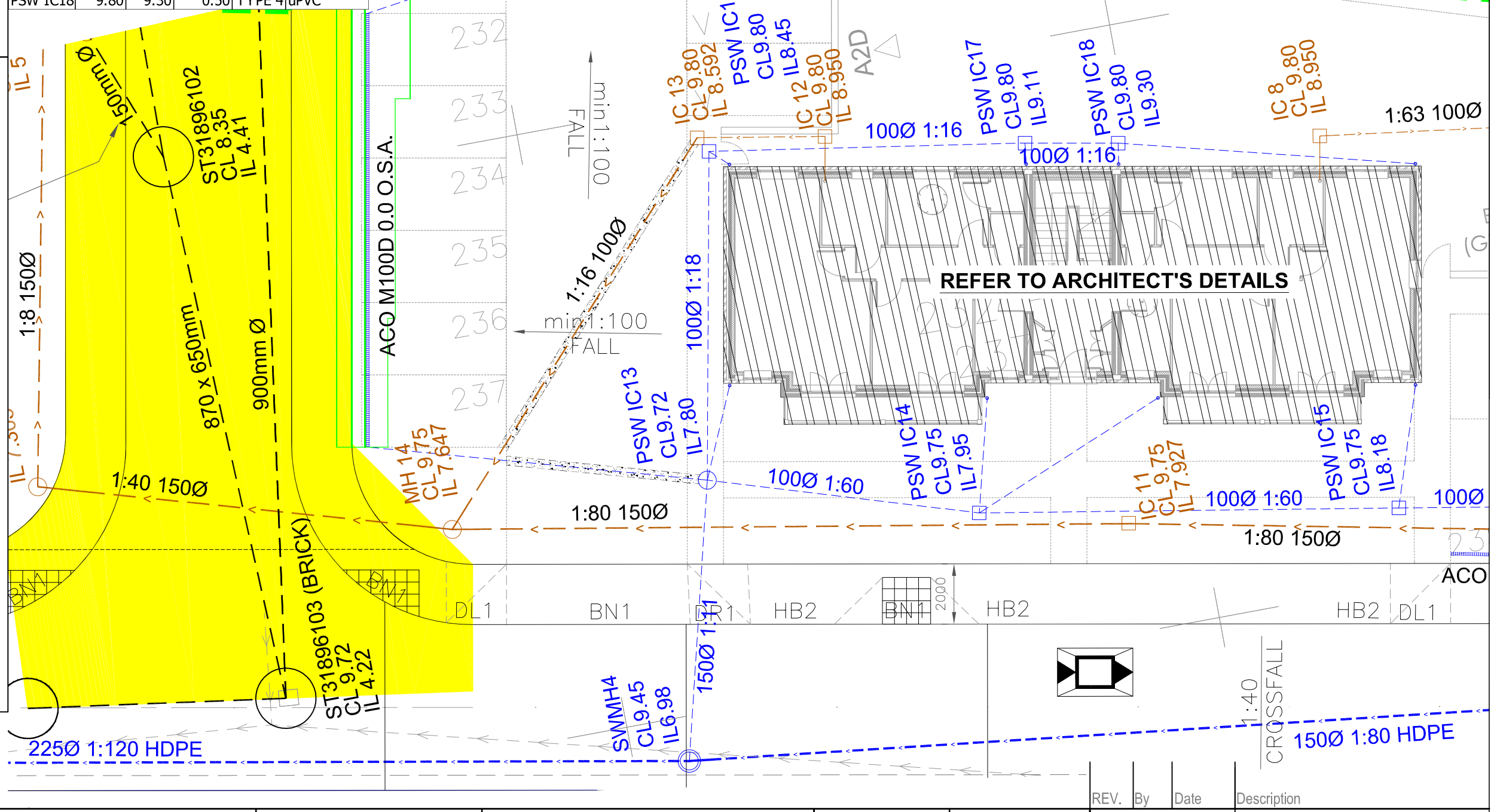
- TYPE 1, PCC CHAMBER

FOR FOUL IC/MH SCHEDULE, REFER TO DRAWING 1155090-S104



PLOTS 15 - 20, DRAINAGE LAYOUT

(SCALE 1:150 @ A3)

REV.	By	Date	Description

STEVE MORGAN ASSOCIATES
CONSULTING ENGINEERS

9 Clytha Park Road Newport NP20 4PB
tel: 01633 266244 fax: 01633 266275
e-mail: engineers@smalimited.co.uk Web: smalimited.co.uk

Client: Keepmoat

Project Description: PROPOSED HOUSING DEVELOPMENT
HERBERT ROAD
PLOTS 15 - 20, DRAINAGE LAYOUT

Drawn	TDJ	Date	27/07/17	Scales	1:150 @ A3
Checked		Date		Drawing Number	522
Project Number	1155090			Rev.	--

APPENDIX B – *DCWW drawings PLA0008910 & NE0825/C103*

Dŵr Cymru
Welsh Water

PLA0008910

N
W E
S

LEGEND(Representative of most common features)

Waste network:

- Foul chamber
- Surface water chamber
- Combined chamber
- Combined sewer overflow
- Special purpose chamber
- Treatment works
- Pumping station
- Outfall
- Lamphole (LH)
- Storm Overflow
- Rising main
- Gravity sewer
- Private sewer
- Private sewer subject to Sect. 104 adoption agreement (S 104)
- Private Sewer Transfer
- Lateral Drain
- Inspection Chamber

NB: Sewer symbol colour indicates the type.

RED - Combined
GREEN - Surface Water
BROWN - Foul
Purple - Former S24 sewers (for indicative purposes only)

Notes:

Whilst every reasonable effort has been taken to correctly record the pipe material of DCWW assets, there is a possibility that in some cases pipe material (other than Asbestos Cement or Pitch Fibre) may be found to be asbestos cement (AC) or Pitch Fibre (PF). It is therefore advisable that the possible presence of AC or PF pipes be anticipated and considered as part of any risk assessment prior to excavation

Dwr Cymru Cyf gives this information as to the position of its underground apparatus by way of general guidance only on the strict understanding that it is based on the best information available and no warranty as to its correctness is relied upon in the event of excavations or other works made in the vicinity of the Company's apparatus and any onus of locating the apparatus before carrying out any excavations rests entirely on you. It must be understood that the furnishing of the information is entirely without prejudice to the provision of the New Roads and Streetworks Act 1991 and of the Company's right to be compensated for any damage to its apparatus.

Service pipes are not generally shown but their presence should be anticipated.

EXACT LOCATIONS OF ALL APPARATUS TO BE DETERMINED ON SITE.

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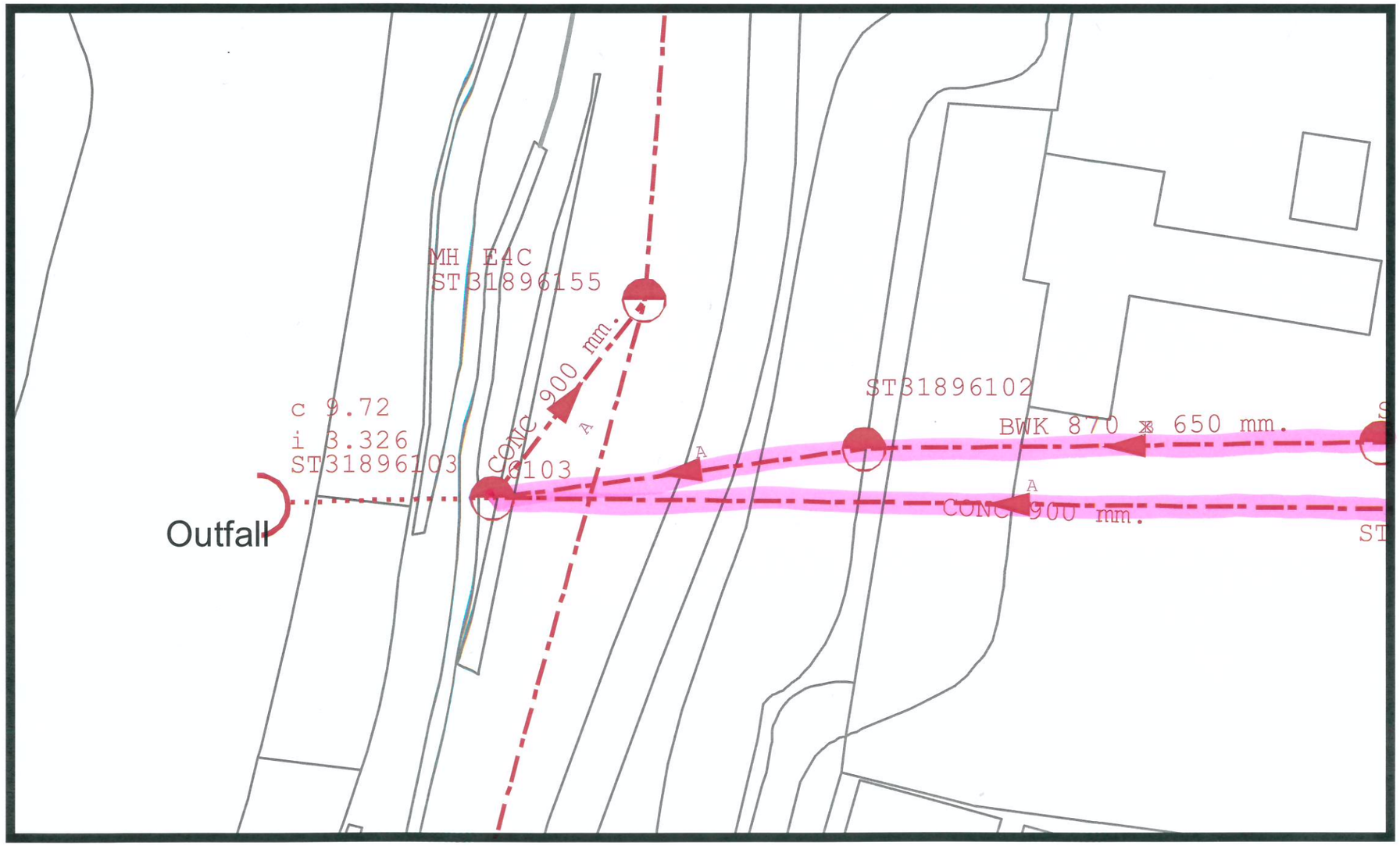
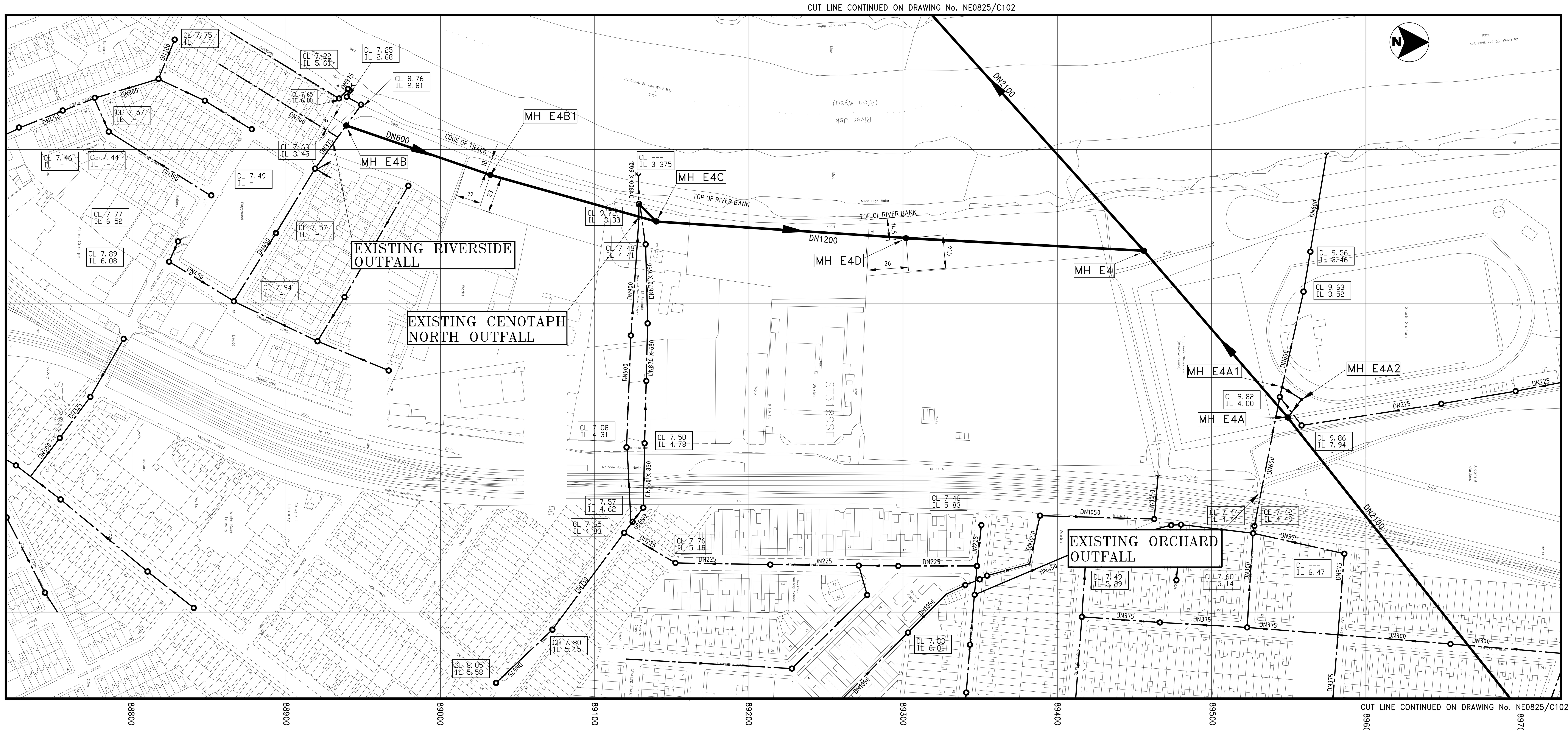
Map Ref:
Map scale: 1:1,046
Printed by:
Printed on:


MH E4C
ST31896155
CONC 900 mm.
A
c 9.72
i 3.326
ST31896103
6103
Outfall
ST31896102
BWK 870 x 650 mm.
A
CONC 900 mm.
A
ST



KEY

- EXISTING FOUL SEWER
- EXISTING STORMWATER SEWER
- NEW FOUL SEWER
- EXISTING PUMPING MAIN
- NEW PUMPING MAIN
- EXISTING MANHOLE
- NEW MANHOLE
- EXISTING MANHOLE LEVELS — CL 13.56 / IL 12.34

MANHOLE CO-ORDINATES

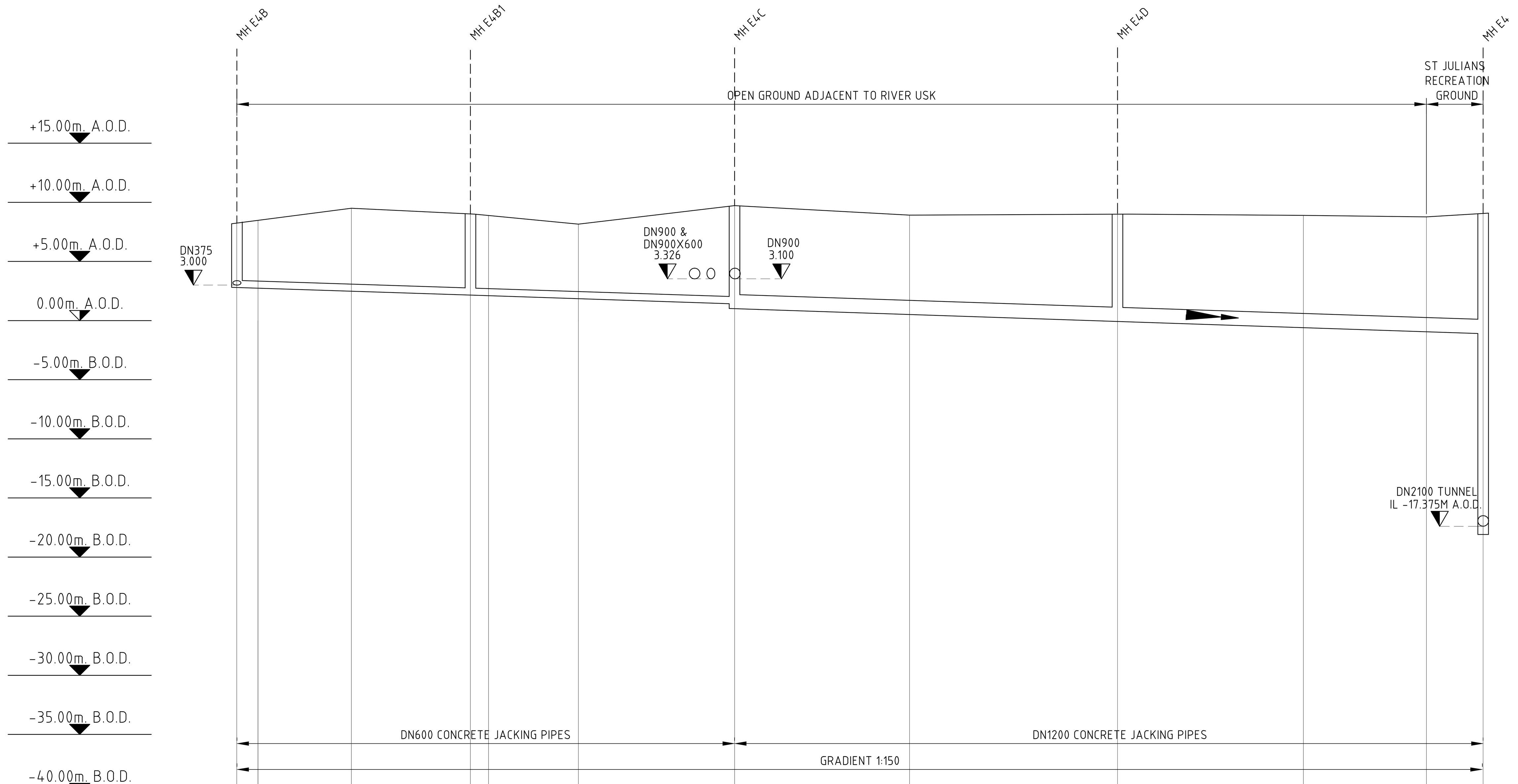
MANHOLE No.	EASTING	NORTHING	
MH E4A1	31754	89545	
MH E4A2	31762	89558	
MH E4B	31584.524	88938.972	(TO BE CONFIRMED ON SITE)
MH E4B1	31616.775	89032.342	(TO BE CONFIRMED ON SITE)
MH E4C	31646.760	89139.930	
MH E4D	31657.600	89301.850	

NOTES

1. INVERT LEVELS OF ALL CONNECTION POINTS ON EXISTING SEWERS TO BE CONFIRMED ON SITE BEFORE COMMENCING THE PRINCIPAL SEWERAGE WORKS
2. FOR GENERAL DETAILS AND NOTES ON STANDARD MANHOLES SEE DRAWING No. NE0825/C538
3. FOR ON LINE TUNNEL SHAFT CO-ORDINATES REFER TO TUNNEL DRAWINGS.

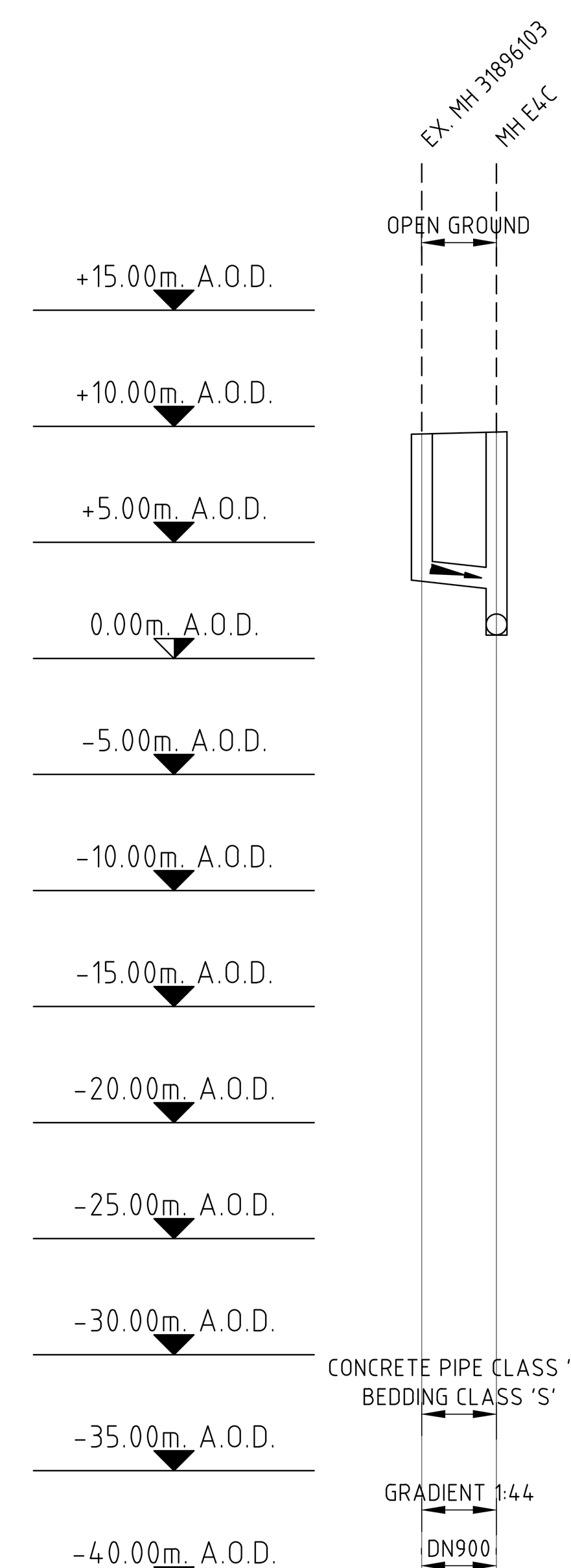
MANHOLE SCHEDULE

MANHOLE No.	CHAMBER RING DIA. (mm)	MANHOLE TYPE
MH E4A1	DN2700	STANDARD MANHOLE TYPE B
MH E4A2	DN2100	STANDARD MANHOLE TYPE C
MH E4B	STANDARD MANHOLE – REFER TO DRAWING No. NE0825/C080 FOR DETAILS	
MH E4B1		
MH E4C	SPECIAL MANHOLE – REFER TO DRAWING No. NE0825/C081 FOR DETAILS	
MH E4D	SPECIAL MANHOLE – REFER TO DRAWING No. NE0825/C082 FOR DETAILS	



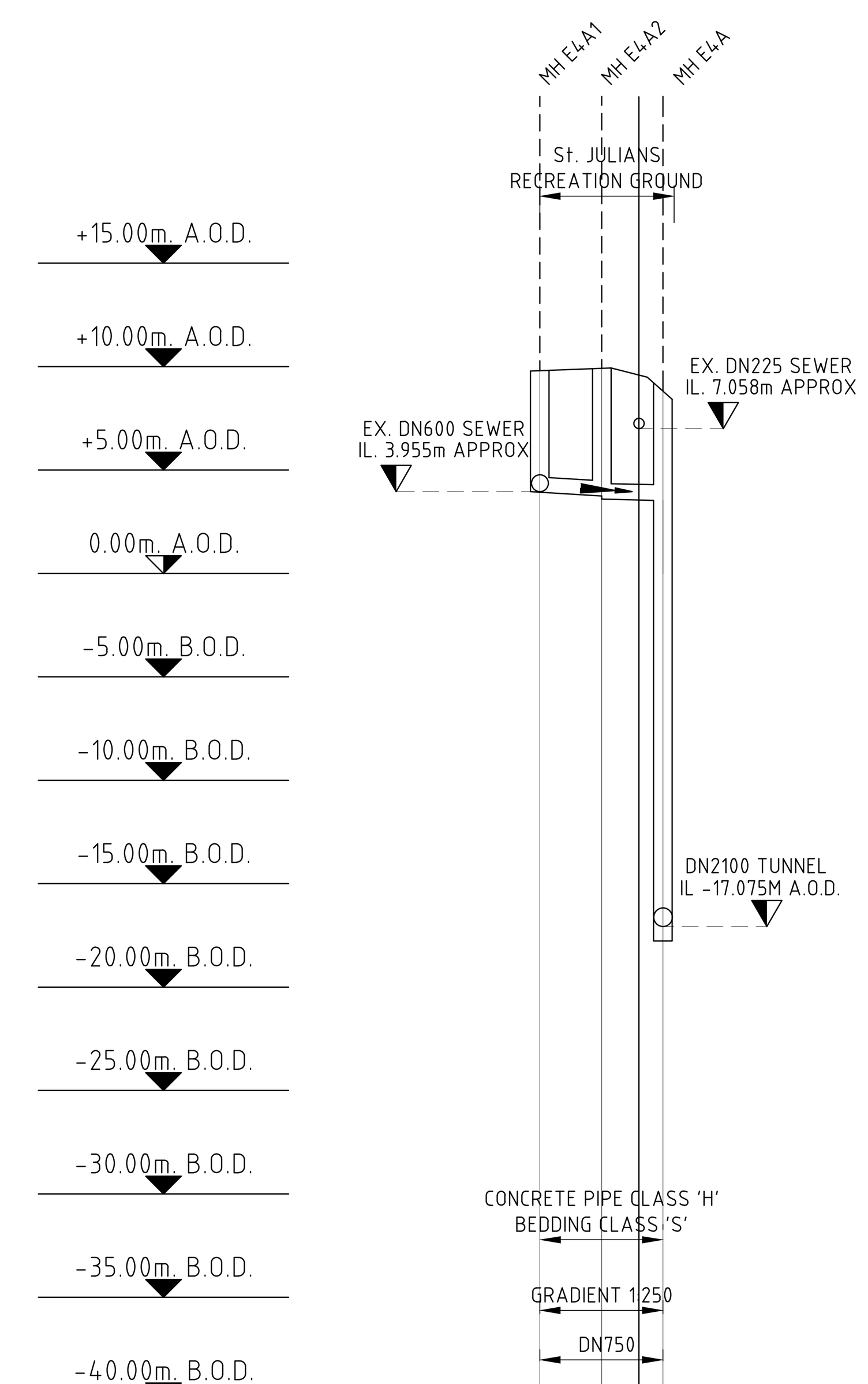
EXISTING G.L.	7.960	9.500	9.000 / 8.830	8.160	9.720	8.900	9.000	8.900	8.770	8.813		
INVERT LEVEL	2.800		2.140		1.407 / 1.007		-0.103			-1.178 / -17.375		
CHAINAGE	526.974	478.500	428.183 / 420.500	382.500	316.500	242.500	154.581	76.000	24.000	0.000		

LONGITUDINAL SECTION OF SEWER FROM MH E4B TO MH E4



EXISTING G.L.	9.670	9.720	
INVERT LEVEL	3.326	3.100	1.007
CHAINAGE	0.000	16.066	

LONGITUDINAL SECTION OF SEWER FROM EX. MH TO MH E4C



EXISTING G.L.	9.800	9.920		8.820		
INVERT LEVEL	3.955	3.805 / 3.745	3.595	3.536	-17.075	
CHAINAGE	0.000	15.000	26.000	29.770		

LONGITUDINAL SECTION OF SEWER FROM MH E4A2 TO MH E4A

O.S. GRID REF ST3189NE ST3189SE ST3188NE

REPRODUCED FROM THE ORDNANCE SURVEY MAP WITH THE SANCTION OF THE CONTROLLER OF H.M. STATIONERY OFFICE. CROWN COPYRIGHT RESERVED.

Issue	Description	Auth.	Ckd.	Appd.	Date
1	AS CONSTRUCTED	G.A.J.	S.P.	A.R.C.	09/05/01

CAD Reference No. E825C103 — Datum NEWLYN

Scale: A0 1:1250 HORIZ, 1:250 VERTICAL

Client: DWR CYMRU WELSH WATER

Project: NEWPORT SEWERAGE AND WASTE WATER TREATMENT WORKS

Title: RIVERSIDE, CENOTAPH NORTH AND ORCHARD CONNECTIONS (SHEET 4 OF 8)

Drg. No. NE0825/C103 — Issue 1

Hyder Consulting
PO Box 4, Pentwyn Road
Nelson. Mid Glamorgan.
CF46 6YA.
TEL: 01443 451888.
FAX: 01443 452144.

Date 19/9/96

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