POWERFUEL

Portland energy recovery facility

Flood risk assessment
Addendum

August 2021

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technical note

Portland Energy Recovery Facility

Flood Risk Assessment Addendum

Project No.	0979
Revision	Initial issue
Date	29 July 2021
Client	Powerfuel Portland Limited
Prepared	C Yalden
Checked	C Yalden
Authorised	I Awcock
File Ref.	**p:\0979 portland port erf\c documents\reports\0979 - portland erf - flood risk assessment addendum.docx**

1 Introduction

1.1 This Flood Risk Assessment (FRA) Addendum has been prepared on behalf of Powerfuel Portland Limited to accompany the August 2020 AWP FRA which was submitted in support of the detailed planning application for a merchant Energy Recovery Facility (ERF) on a brownfield site within the existing and operational Portland Port (Planning ref. WP/20/00692/DCC).

1.2 The addendum responds to matters raised by Dorset Council's (DC) Flood Risk Management (FRM) team through the consultation process, with a copy of their consultation email dated 11th November 2020 included within Appendix A of this addendum (DC ref. PLN20-069). The addendum also draws reference to further advice received from DC FRM through their charged advice service.

1.3 Each matter raised within DC FRM's consultation email has been set out below in italics, with further explanation or technical input provided to advise our response.

2 Response to matters raised

2.1 ***The applicant has not demonstrated in their application that the existing outfall pipes have adequate capacity for the unattenuated flows coming from the Waste Recovery Site.***

Although a free discharge to the sea is allowable at this location, as it will have no discernible impact on downstream tidal flood risk, the conveyance of this free discharge needs to be sized accordingly. Where existing connections are to be used, this should consider, not only the size of the pipe but any contributions from development elsewhere. If a full, unattenuated discharge cannot be achieved due to capacity issues, then some attenuation might be needed to reduce peak flows.

Surcharge of the system needs to be avoided during normal conditions as exceedance flows directly to tidal waters could conceivably convey contaminants off site.

2.2 The existing outfalls which serve the application site fall under the ownership and responsibility of Portland Port Ltd (PPL). Through discussions with PPL we have received copies of historic drainage records linked to the existing site drainage, together with recently commissioned drainage surveys.

2.3 The surveys confirm the presence of three separate drainage outfalls, all serving the application site only. Two eastern outfalls discharge into the foreshore at Balaclava Bay, with a final northern outfall discharging into Portland Port.

2.4 The eastern outfalls can be seen at ground level, secured to the foreshore. Their alignment is consistent with the historic drainage plans. The outfalls are 225mm and 300mm diameter, with assumed gradients 1:6.5 and 1:12 respectively, based on the gradient of the foreshore. The northern outfall is 100mm diameter, with approximately gradient 1:50.

2.5 The hydraulic capacity of the outfalls can be seen summarised within Table 2.1 below.

Table 2.1 – Existing Outfall Capacities

Outfall Ref.	Gradient	Hydraulic Capacity
Eastern 300mm	1:12	323 l/s

Outfall Ref.	Gradient	Hydraulic Capacity
Eastern 225mm	1:6.5	205 l/s
Northern 100mm	1:50	8.5 l/s

2.6 The Surface Water Management Plan (SWMP) within the August 2020 AWP FRA proposes to discharge the clean roof catchment through the eastern outfalls to Balaclava Bay, whilst runoff from the yard and trafficked highway areas would be discharged through the northern outfall to Portland Port.

2.7 The Q100 peak unattenuated flow for each site catchment has been calculated using the Modified Rational Method (HR Wallingford, 1990). The flow rate has been compared against the relevant outfall(s) to determine whether there is sufficient capacity to drain unattenuated flows from the site. The output from this exercise has been seen summarised within Table 2.2 below.

Table 2.2 – Unattenuated Site Discharges (Review)

Catchment Ref.	Catchment Area	Peak Flow (Q100)	Outfall Ref.	Hydraulic Capacity
Clean Roof	0.782 ha	265 l/s	Eastern Outfalls (300mm & 225mm)	528 l/s (cumulative)
Yard and Trafficked Areas	0.681 ha	231 l/s	Northern 100mm	8.5 l/s

2.8 Table 2.2 above demonstrates that the eastern outfalls have sufficient capacity to drain the clean roof area. It is recommended that any residual capacity within the eastern outfalls is proportionally distributed and therefore the preliminary drainage layout drawing which appends the FRA has been updated to show approximately 40% of the roof catchment draining to the 225mm outfall, with the remaining 60% draining to the 300mm outfall.

2.9 The above table also demonstrates that the northern outfall has insufficient capacity to drain the proposed yard and trafficked areas. We have prepared a series of hydraulic models to simulate the northern outfall and have run a range

of unattenuated storm events to establish the potential flooded volumes that might occur.

2.10 The results from the above models have been summarised within Table 2.3, together with an adjusted attenuation requirement, which considers the capacity of the proposed swales promoted by the SWMP.

Table 2.3 – Northern Outfall Modelling

Return Period	Flooded Volume	FRA SWMP Attenuation	Adjusted Attenuation Req.
2 year (+40% CC)	65 m^3	65 m^3 (swales)	+0 m^3
5 year (+40% CC)	100 m^3		+35 m^3
10 year (+40% CC)	135 m^3		+70 m^3
30 year (+40% CC)	200 m^3		+135 m^3
100 year (+40% CC)	295 m^3		+230 m^3

2.11 Table 2.3 demonstrates that the northern outfall and proposed swales are able to accommodate runoff in up to the 2 year return period with 40% allowance for climate change. Beyond this the network would become overwhelmed and up to 230 m^3 of flooding would occur in the 100 year return period.

2.12 It is considered that a 2 year (+CC) capacity would drain the first flush from a greater return period storm, thereby reducing the risk of pollution due to overland exceedance flows. Through discussions with DC FRM it was suggested that the existing outfalls may not have to demonstrate capacity to manage flows in up to the 100 year return period (+CC), provided the network would not be regularly overwhelmed.

2.13 An appropriate design event for the northern outfall has not been agreed with DC FRM however the results within Table 2.3 identify the necessary attenuation provisions required mitigate on-site flooding for a range of storm events.

2.14 The preliminary drainage layout drawing which appended the August 2020 AWP FRA has been updated as part of this Addendum and now shows the surveyed outfall alignments, together with an offline geo-cellular attenuation tank which can provide up to 230 m^3 storage volume.

2.15 Copies of the updated Preliminary Drainage Layout drawing and any hydraulic modelling or calculations can be found within Appendix B and Appendix C respectively.

2.16 ***Due to the lack of survey information there can be no certainty that the current condition of the existing network is suitable for discharge of surface water from the site.***

2.17 The existing outfalls which serve the application site fall under the ownership and responsibility of PPL.

2.18 PPL have commissioned a series of CCTV condition surveys for each outfall. These have only been partially completed due to limited access for the eastern outfalls (survey required from submerged outfalls) and partial blockage for the northern outfall (PPL are due to undertake remedial repairs).

2.19 PPL have advised that the outfalls can be retained for re-use to serve the application site. PPL will retain ownership and responsibility for the systems and therefore we trust that a suitable planning condition can be agreed to secure the submission of post-repair surveys for all outfalls.

2.20 Copies of the currently available survey information can be found within Appendix D of this Addendum.

3 Conclusions

3.1 Following the consultation response received from DC FRM, we have undertaken further consultation, coordinated additional drainage surveys and completed a series of hydraulic models.

3.2 The additional design input has concluded that the existing eastern drainage outfalls to Balaclava Bay have sufficient capacity to receive unattenuated flows from the roof catchment only. CCTV condition survey of the eastern outfalls requires access to their submerged outfalls. Ownership and responsibility for the outfalls remains with PPL and it is recommended that further evidence can be

submitted at discharge of condition stage, following any potential remedial repairs, to demonstrate the suitability of the existing outfalls.

3.3 It is concluded that the existing northern drainage outfall to Portland Port has sufficient capacity (in conjunction with the proposed on-site swales) to serve the yard and trafficked areas in up to a 2 year return period only (inc. climate change). This would also drain the first-flush from greater return period storms, reducing the risk of pollution from exceedance flows.

3.4 A suitable design event should be agreed with DC FRM, beyond which exceedance flows from the northern outfall can be allowed to flow overland towards Balaclava Bay/Portland Port. Any extra-over attenuation requirements to accommodate flows from the design event can be provided in the form of an offline geo-cellular attenuation tank.

3.5 The additional studies undertaken by this Addendum have demonstrated the presence of existing surface water outfalls that currently serve the application site. The ability to utilise these outfalls and a commitment to ensure they remain operational throughout the development's lifetime has been agreed with PPL.

3.6 The preliminary drainage layout drawing which appends this Addendum identifies additional offline attenuation. This attenuation will manage excess flows from the northern outfall up to an agreed design event.

3.7 Based on the outputs from this Addendum, it is concluded that the development can be undertaken in a sustainable manner and can remain safe from flooding whilst also reducing flood risk overall.

3.8 It is recommended that DC FRM advise the LPA that their objection can be removed, with suitable planning conditions covering a) the submission of further survey information to demonstrate serviceable drainage outfalls, and b) the submission of a final drainage scheme with capacity to manage flows up to an agreed design event, beyond which flows are permitted to exceed the system and route overland.

AWP

Appendix A DC FRM Consultation Response

Planning

From: FloodRiskManagement
Sent: 11 November 2020 17:04
To: Planning; Jerry Smith
Subject: RE: PLN20-069 - WP/20/00692/DCC - Portland Port, Castletown, Portland _ Consultation response

Follow Up Flag: Follow up
Flag Status: Flagged

Dorset Council, Flood Risk Management Team
Dorset Highways, County Hall, Dorchester

[redacted]

Lead FRM Officer: Rob Hanson
Direct Dial: [redacted]

Date: 11 November 2020

Internal LLFA Consultation – Surface Water (SW) Management

Our Ref: PLN20-069

Proposal: Construction of an energy recovery facility with ancillary buildings and works including administrative facilities, gatehouse and weighbridge, parking and circulation areas, cable routes to ship berths and existing off-site electrical sub-station, with site access through Portland Port from Castletown.

Your Ref: WP/20/00692/DCC

Location: Portland Port, Castletown, Portland DT5 1PP

Grid Ref: 368998, 74438

We write in response to the above consultation, sent to us as relevant Lead Local Flood Authority (LLFA), and statutory consultee for Surface Water (SW) management in respect of major development (as defined within Article 2(1) of the Town & Country Planning, Development Management Procedure, England Order 2015) and legislated for under The Town and Country Planning (Development Management Procedure) (England) Order 2015, schedule 4, paragraph (ze). Given that the proposal under consideration relates to a Waste / Minerals Site, we acknowledge that it qualifies as major development.

The brownfield site of the proposal is shown to fall largely within Flood Zone 1 (low risk of fluvial / tidal flooding), as indicated by the Environment Agency's (EA) indicative flood maps. Whilst according to the EA's Risk of Flooding from SW (RoFfSW) mapping there is no theoretical risk of pluvial flooding to the site up to the 1-in-100 year rainfall event with only some isolated ponding shown to develop during the 1-in-1000 year rainfall event.

Due to the proximity of coastal waters, the site is very close or directly adjacent to areas of Flood Zone 2 along both the north and east boundaries. Whilst, according to the EA's Risk of Flooding from SW (RoFfSW) mapping, the site is near to an additional small area of surface water ponding just outside the north boundary of the site during the 1-in-100 year rainfall event and above.

The risk to the site is considered low, however, regardless of prevailing risk, any development has the potential to exacerbate or create flood risk, if runoff is not appropriately considered and managed as evidenced by a substantiated SW strategy. Ordinarily therefore, and in keeping with the requirements of the National Planning Policy Framework (NPPF), all major development proposals must take due consideration of SW management and should offer a drainage strategy that does not create or exacerbate off site worsening and should mitigate flood risk to the site.

To this end, the information supplied in relation to SW management includes the following:

- Portland Energy Recovery Facility (Powerfuel Portland Limited) - *Flood Risk Assessment* by AWP – September 2020
- Coastal Flooding Assessment Report (June 2009) by RPS Consulting Engineers

The documents referenced above provide detail regarding drainage from the applicant's site. As a result, we can acknowledge the following:

- BGS data indicates that the site is underlain by a dominate bedrock of impermeable Mudstone (Kimmeridge Clay Formation) therefore infiltration methodologies are not proposed for surface water management.

- The applicant proposes to discharge surface water runoff at an unrestricted rate into the sea via two existing outfalls. The drainage strategy explains that surface water runoff from roof areas is proposed to be directed to an existing outfall at Balaclava Bay and runoff from the highway or yard areas are to be directed through a separate outfall at Portland Port.

- The applicant proposes to manage the risk of pollution of coastal waters from polluted surface water runoff from the highway and yard areas with rain gardens, a swale and an oil bypass separator.

- The applicant proposes that levels on site will be made to slope away from the built development in order to allow any water from wave overtopping to be redirected back towards the sea.

However, the following concerns need to be addressed / clarified further. At this time therefore, we recommend that a (Holding) Objection be applied to this proposal.

The applicant has not demonstrated the viability of the existing outfalls or how, legally and technically, a new outfall could be created. The following points need to be addressed:

- The applicant has not demonstrated in their application that the existing outfall pipes have adequate capacity for the unattenuated flows coming from the Waste Recovery Site.

  Although a free discharge to the sea is allowable at this location, as it will have no discernible impact on downstream tidal flood risk, the conveyance of this free discharge needs to be sized accordingly. Where existing connections are to be used, this should consider, not only the size of the pipe but any contributions from development elsewhere. If a full, unattenuated discharge cannot be achieved due to capacity issues, then some attenuation might be needed to reduce peak flows.

- Also due to the lack of survey information there can be no certainty that the current condition of the existing network is suitable for discharge of surface water from the site.

- Surcharge of the system needs to be avoided during normal conditions as exceedance flows directly to tidal waters could conceivably convey contaminants off site.

For the above reasons a proper survey is needed to ascertain whether the discharge route is viable and whether attenuation on site will be needed, given the capacity and condition of the existing pipes.

If, the applicant is not willing to undertake a survey, or if a survey suggests that the existing system is compromised or not viable, then the applicant will need to demonstrate how a new outfall can be legally created and put into use. Where this will rely on third parties, in principle agreement(s) will need to be submitted in support of these proposals. For instance, a new discharge route to sea, may need regulatory approval from the Marine Management Organisation (MNO).

Further details / evidence will need to be submitted in order to address / clarify the above concerns and to show that the drainage proposals are feasible.

We are unable to ascertain, to our satisfaction, the appropriateness of any SW management in accordance with the Ministerial statement 'Sustainable Drainage System' 2014, chapter 14 of the NPPF and Planning Policy Guidance (PPG). As relevant LLFA in this matter we are unable to confirm that the applicant has met DEFRA's technical guidance or relevant local and national policies concerning drainage.

Our (Holding) Objection may be overcome via the submission of further or additional details outlining a site-specific SW management scheme. Accordingly, we ask to be re-consulted on the SW scheme if further information is supplied. Our objection will be maintained until an adequate a SW scheme has been approved in-principle. We may at that stage request suitable planning condition/s and informative/s to cover detailed design, future maintenance and potential requirement for other permissions.

INFORMATIVES

- Permissions from the EA or Marine Management Organisation (MMO) may be needed in respect of SW discharge(s) and any construction works. The applicant will need to ensure that they comply with any other legislation relevant to these proposals. We note that the EA and MMO have already been consulted.
- The applicant is advised to have early discussions with Wessex Water in relation to the possible adoption of SuDS features in order to ensure that the final designs are in line with their requirements.

Please do not hesitate to contact me should you require further clarification of our position or the scope of additional information that is required. To assist in this respect, I suggest the applicant review our generic guidance note, which can be found at: www.dorsetcouncil.gov.uk/localfloodrisk.

Yours Sincerely,

Rob Hanson,
Flood Risk Engineer.

Appendix B Preliminary Drainage Layout

Existing surface water outfall to Portland Port to receive runoff from yard and trafficked areas. Upstream open SuDS and belowgound attenuation will mitigate site flooding up to the design even.

Proposed swales to receive sheet flow runoff from highway and yard, to provide treatment before discharge to surface water network. Perforated pipe to be laid within permeable sub-base beneath to receive runoff and to convey flows to the surface water network. Swales to provide cumulative 65m3 attenuation storage (sufficient to accommodate all runoff in up to the 2 year +CC return period storm).

100Ø (44m) 1:30

Assumed route of existing surface water outfall from pre-development site (to be confirmed).

14.2m x 1.5m diameter oversized sewer to provide pump station storage for 25cum/hr of Boiler startup discharge.

Highways & Yard Water Discharge
Development runoff to discharge via existing outfall to Portland Harbour (Exact point of connection and position to be confirmed).

Proposed oil interceptor (Full Retention Separator or similar approved) to treat highway and yard runoff prior to discharge to Portland Harbour.

Proposed off-line geo-cellular attenuation tank provides additional storage to accommodate runoff beyond the 2 year return period. The upper design limit for the tank should be agreed with DC FRM but is shown on plan as 230m3 which is sufficient to mitigate any on-site flooding in up to the 100 year CC return period storm.

Existing surface water outfall to Balaclava Bay to receive approximately 40% of clean runoff from proposed development.

3.5m AOD

230m 225Ø @1.5 205l/s Capacity

0.00m AOD

Clean Water Discharge
Development runoff (clean roof only) to discharge via existing outfall to Balaclava Bay.

Foul Water Discharge
Pumped foul flows to discharge to existing Wessex Water combined sewer, via a new gravity break chamber as agreed with Wessex Water.

Transformer pit sump with oil detection and pumped discharge

Clean Water Discharge
Development runoff (clean roof only) to discharge via existing outfall to Balaclava Bay.

Existing surface water outfall to Balaclava Bay to receive approximately 60% of clean runoff from proposed development.

1.00m AOD

28.0m 300Ø @1:12.5 231l/s Capacity

-1.00m AOD

Balaclava Bay

Mean High Water

Mean Low Water

Area Summary Schedule

Existing Impermeable Area	1.679 ha
Proposed Roof Area	0.782 ha
Proposed Highway & Yard Area	0.681 ha
Total Proposed Imp. Area	1.463 ha

Key:

- Site Boundary

Existing Drainage:

- Wessex Water Combined Sewer
- Retained Surface Water Drainage

Proposed Catchment Areas:

- Clean Roof Area
- Yard Area
- Highway Area

Proposed drainage:

- Clean Roof Surface Water Sewer
- Highway and Yard Surface Water Sewer
- Drainage Channel
- Shallow Swale With Permeable Sub-Base
- Oil Interceptor
- Foul Sewer (Will comprise multiple runs to separate trade and domestic waste)
- Foul Raising Main
- Foul Pumping Station
- Foul Gravity Brake Chamber
- Foul Drain
- Exceedance Flow
- Gabion Retaining Wall

Notes:

1. The proposed development has been assessed in line with the NPPF and The Dorset Waste Plan, to allow the planning application to be progressed and to show that the development can be undertaken in an acceptable manner from a flood risk perspective.
2. The extent of built development within the ERF area is limited to 'Flood Zone 1' only and is not considered to be at risk of flooding from pluvial, groundwater, infrastructure, artificial sources or wave action.
3. The wider application boundary includes land inside Flood Zones 2 and 3 however these areas are being used to facilitate utility and highway enabling works and will not be impacted by or have an impact on existing flood risk.
4. To ensure the development is safe throughout its lifetime, the surface water strategy accounts for runoff in up to the 100 year return period.
5. The strategy also safeguards against the upper end allowances for climate change (40%), providing betterment over undeveloped conditions, where the rate and volume of runoff would continue to increase due to climate change.
6. Made ground from previous site uses and the potential for raised groundwater related to tidal ranges precludes the use of soakaway based drainage.
7. Surface water runoff will be captured and discharged directly to sea and will seek to re-use existing points of outfall.
8. The proposed development reduces the sites existing impermeable catchment and therefore provides betterment in terms of peak rates and volumes of discharge.
9. Runoff from roofs will drain directly to Balaclava Bay, whilst highway and yard areas will drain through a new SuDS swale and bypass separator prior to discharging to Portland Port.
10. During exceedance events runoff will be directed towards areas of green space or yard areas where flows can be temporarily stored above ground.
11. The reduction in peak runoff from the site and the inclusion of SuDS treatment drainage systems, will ensure provide betterment over existing site conditions and will therefore have no adverse negative impacts on committed development sites that are being assessed as part of the EIA.
12. Due to existing levels, foul flows generated by the development will be pumped to the existing WW combined network to the west of the site.
13. Any private drainage networks or features will be designed in accordance with Building Regulations Part H. The operation and maintenance of all private drainage will be the responsibility of a third party management company.
14. Any adoptable drainage networks will be designed in accordance with Sewers for Adoption and will be handed to to the respective Water Authority for adoption.
15. This Preliminary Drainage Layout does not attempt to present a final design of the proposed drainage systems. Detailed design of the systems and any inherent features will commence upon approval of the strategy and will include assessments due to site investigations, health and safety, CDM ect.

REV	DATE	DESCRIPTION	BY	CHK	APD
D	29.07.2021	UPDATED POINT OF DISCHARGE AND DRAINAGE ROUING.	TMR	AJH	CPY
C	27.08.2020	BACKGROUND LAYOUT AMENDED	TMR	AJH	CPY
B	07.08.2020	UPDATES TO SUIT LANDSCAPING PLAN	TMR	AJH	CPY
A	10.07.2020	INITIAL ISSUE	TMR	AJH	CPY

DRAWING STATUS: PLANNING APPLICATION

CLIENT: POWERFUEL LIMITED

PROJECT: PORTLAND ERF

TITLE: PRELIMINARY DRAINAGE LAYOUT

PROJECT No:	DRAWING No:	REV:
0979	PDL-101	D

SCALE @ A1: 0 1:500 25 metres

DESIGN BY:

awcockward partnership
Awcock Ward Partnership, Kensington Court, Woodwater Park, Pynes Hill, Exeter, EX2 5TY
Tel: 01392 409007 Web: www.awpexeter.com

Appendix C MicroDrainage & Calcs

Colebrook-White Pipe Capacity Analysis

Project No.	0979
Project Title	Portland Port ERF
Client	Powerfuel Portland Limited
Sheet Ref	P:\0979 Portland Port ERF\D Design and Analysis\SPREADSHEETS\01 Drainage\03 Sewer Design\[Colebrook White Equation (pipe velocity & capacity) - North.xlsx]Colebrook-White (NORTH)

Calcs by	TMR
Checked by	CPY
Approved by	IDA
Date	29.07.2021
Revision	INITIAL ISSUE

Pipe capacity calculation based on the Colebrook White Equation (HR Wallingford, 1990);

$$V = -2\sqrt{(2gDS)}\log_{10}\left(\frac{k_s}{3.7D} + \frac{2.51\nu}{D\sqrt{(2gDS)}}\right)$$

Fluid type: **Surface**

Where:

D	*Pipe diameter*		**225**	mm
S	*Hydraulic gradient*	1 in	**6.5**	m/m
k_s	Effective pipe roughness		**0.6**	mm
g	*Gravitiational acceleration*		**9.81**	m/s^2
ν	*kinematic viscosity*		**1.01E-06**	m^2/s
A	*Cross-sectional flow area*		**0.040**	m^2
Q	*Discharge*		**205**	l/s
V	Velocity		**5.17**	m/s

Colebrook-White Pipe Capacity Analysis

Project No.	0979
Project Title	Portland Port ERF
Client	Powerfuel Portland Limited
Sheet Ref	P:\0979 Portland Port ERF\D Design and Analysis\SPREADSHEETS\01 Drainage\03 Sewer Design\[Colebrook White Equation (pipe velocity & capacity).xlsx]Colebrook-White (SOUTH)

Calcs by	TMR
Checked by	CPY
Approved by	IDA
Date	29.07.2021
Revision	INITIAL ISSUE

Pipe capacity calculation based on the Colebrook White Equation (HR Wallingford, 1990);

$$V = -2\sqrt{(2gDS)}\log_{10}\left(\frac{k_s}{3.7D} + \frac{2.51\nu}{D\sqrt{(2gDS)}}\right)$$

Fluid type: **Surface**

Where:

D	*Pipe diameter*		**300**	mm
S	*Hydraulic gradient*	1 in	**12**	m/m
k_s	Effective pipe roughness		**0.6**	mm
g	*Gravitiational acceleration*		**9.81**	m/s^2
ν	*kinematic viscosity*		**1.01E-06**	m^2/s
A	*Cross-sectional flow area*		**0.071**	m^2
Q	*Discharge*		**323**	l/s
V	Velocity		**4.56**	m/s

STORM SEWER DESIGN by the Modified Rational Method

Design Criteria for Storm

Pipe Sizes STANDARD Manhole Sizes STANDARD

FSR Rainfall Model - England and Wales

Return Period (years)	2	PIMP (%)	100
M5-60 (mm)	18.800	Add Flow / Climate Change (%)	0
Ratio R	0.345	Minimum Backdrop Height (m)	0.200
Maximum Rainfall (mm/hr)	50	Maximum Backdrop Height (m)	1.500
Maximum Time of Concentration (mins)	30	Min Design Depth for Optimisation (m)	1.200
Foul Sewage (l/s/ha)	0.000	Min Vel for Auto Design only (m/s)	1.00
Volumetric Runoff Coeff.	0.750	Min Slope for Optimisation (1:X)	500

Designed with Level Soffits

Time Area Diagram for Storm

Time (mins)	Area (ha)	Time (mins)	Area (ha)
0-4	0.515	4-8	0.199

Total Area Contributing (ha) = 0.714

Total Pipe Volume (m³) = 0.581

Network Design Table for Storm

« - Indicates pipe capacity < flow

PN	Length (m)	Fall (m)	Slope (1:X)	I.Area (ha)	T.E. (mins)	Base Flow (l/s)	k (mm)	HYD SECT	DIA (mm)	Section Type	Auto Design
1.000	10.000	0.200	50.0	0.238	5.00	0.0	0.600	o	100	Pipe/Conduit	
1.001	20.491	0.410	50.0	0.238	0.00	0.0	0.600	o	100	Pipe/Conduit	
1.002	43.521	0.870	50.0	0.238	0.00	0.0	0.600	o	100	Pipe/Conduit	

Network Results Table

PN	Rain (mm/hr)	T.C. (mins)	US/IL (m)	Σ I.Area (ha)	Σ Base Flow (l/s)	Foul (l/s)	Add Flow (l/s)	Vel (m/s)	Cap (l/s)	Flow (l/s)
1.000	50.00	5.15	98.500	0.238	0.0	0.0	0.0	1.09	8.6«	32.2
1.001	50.00	5.47	98.175	0.476	0.0	0.0	0.0	1.09	8.6«	64.5
1.002	50.00	6.13	97.565	0.714	0.0	0.0	0.0	1.09	8.6«	96.7

Manhole Schedules for Storm

MH Name	MH CL (m)	MH Depth (m)	MH Connection	MH Diam.,L*W (mm)	Pipe Out PN	Pipe Out Invert Level (m)	Pipe Out Diameter (mm)	Pipes In PN	Pipes In Invert Level (m)	Pipes In Diameter (mm)	Backdrop (mm)
MH 01	100.000	1.500	Open Manhole	1200	1.000	98.500	100				
MH02	100.000	1.825	Open Manhole	1200	1.001	98.175	100	1.000	98.300	100	125
MH03	100.000	2.435	Open Manhole	1200	1.002	97.565	100	1.001	97.765	100	200
	100.000	3.305	Open Manhole	0		OUTFALL		1.002	96.695	100	

Free Flowing Outfall Details for Storm

Outfall Pipe Number	Outfall Name	C. Level (m)	I. Level (m)	Min I. Level (m)	D,L (mm)	W (mm)
1.002		100.000	96.695	0.000	0	0

Simulation Criteria for Storm

Volumetric Runoff Coeff	0.750	Additional Flow - % of Total Flow	0.000
Areal Reduction Factor	1.000	MADD Factor * 10m³/ha Storage	2.000
Hot Start (mins)	0	Inlet Coeffiecient	0.800
Hot Start Level (mm)	0	Flow per Person per Day (l/per/day)	0.000
Manhole Headloss Coeff (Global)	0.500	Run Time (mins)	60
Foul Sewage per hectare (l/s)	0.000	Output Interval (mins)	1

Number of Input Hydrographs 0 Number of Offline Controls 0 Number of Time/Area Diagrams 0
Number of Online Controls 0 Number of Storage Structures 0 Number of Real Time Controls 0

Synthetic Rainfall Details

Rainfall Model	FSR	Profile Type	Summer
Return Period (years)	2	Cv (Summer)	0.750
Region	England and Wales	Cv (Winter)	0.840
M5-60 (mm)	18.800	Storm Duration (mins)	30
Ratio R	0.345		

1 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for Storm

Simulation Criteria

Areal Reduction Factor	1.000	Additional Flow - % of Total Flow	0.000
Hot Start (mins)	0	MADD Factor * 10m³/ha Storage	2.000
Hot Start Level (mm)	0	Inlet Coeffiecient	0.800
Manhole Headloss Coeff (Global)	0.500	Flow per Person per Day (l/per/day)	0.000
Foul Sewage per hectare (l/s)	0.000		

Number of Input Hydrographs 0 Number of Offline Controls 0 Number of Time/Area Diagrams 0
Number of Online Controls 0 Number of Storage Structures 0 Number of Real Time Controls 0

Synthetic Rainfall Details

Rainfall Model FSR M5-60 (mm) 18.700 Cv (Summer) 0.750
Region England and Wales Ratio R 0.345 Cv (Winter) 0.840

Margin for Flood Risk Warning (mm) 0.0 DVD Status OFF
Analysis Timestep Fine Inertia Status OFF
DTS Status ON

Profile(s)	Summer and Winter
Duration(s) (mins)	15, 30, 60, 120, 180, 240, 360, 480, 600, 720, 960, 1440, 2160, 2880, 4320, 5760, 7200, 8640, 10080
Return Period(s) (years)	1, 2, 5, 10, 30, 100
Climate Change (%)	40, 40, 40, 40, 40, 40

PN	US/MH Name	Event	US/CL (m)	Water Level (m)	Surcharged Depth (m)	Flooded Volume (m³)	Flow / Cap.	Overflow (l/s)	Total Overflow Vol(m³)
1.000	MH 01	120 minute 1 year Winter I+40%	100.000	100.020	1.420	20.491	1.50		
1.001	MH02	60 minute 1 year Winter I+40%	100.000	100.015	1.740	14.959	1.58		
1.002	MH03	30 minute 1 year Winter I+40%	100.000	100.003	2.338	3.218	1.92		

PN	US/MH Name	Infil. Flow (l/s)	Infil. Vol (m³)	Maximum Vol (m³)	Pipe Flow (l/s)	Status
1.000	MH 01			22.181	12.0	FLOOD
1.001	MH02			17.003	13.0	FLOOD
1.002	MH03			6.118	16.2	FLOOD

2 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for Storm

Simulation Criteria

Areal Reduction Factor	1.000	Additional Flow - % of Total Flow	0.000
Hot Start (mins)	0	MADD Factor * 10m³/ha Storage	2.000
Hot Start Level (mm)	0	Inlet Coeffiecient	0.800
Manhole Headloss Coeff (Global)	0.500	Flow per Person per Day (l/per/day)	0.000
Foul Sewage per hectare (l/s)	0.000		

Number of Input Hydrographs 0 Number of Offline Controls 0 Number of Time/Area Diagrams 0
Number of Online Controls 0 Number of Storage Structures 0 Number of Real Time Controls 0

Synthetic Rainfall Details

Rainfall Model FSR M5-60 (mm) 18.700 Cv (Summer) 0.750
Region England and Wales Ratio R 0.345 Cv (Winter) 0.840

Margin for Flood Risk Warning (mm) 0.0 DVD Status OFF
Analysis Timestep Fine Inertia Status OFF
DTS Status ON

Profile(s)	Summer and Winter
Duration(s) (mins)	15, 30, 60, 120, 180, 240, 360, 480, 600, 720, 960, 1440, 2160, 2880, 4320, 5760, 7200, 8640, 10080
Return Period(s) (years)	1, 2, 5, 10, 30, 100
Climate Change (%)	40, 40, 40, 40, 40, 40

PN	US/MH Name	Event	US/CL (m)	Water Level (m)	Surcharged Depth (m)	Flooded Volume (m³)	Flow / Cap.	Overflow (l/s)	Total Overflow Vol(m³)
1.000	MH 01	120 minute 2 year Winter I+40%	100.000	100.032	1.432	32.039	1.52		
1.001	MH02	60 minute 2 year Winter I+40%	100.000	100.026	1.751	25.781	1.60		
1.002	MH03	30 minute 2 year Winter I+40%	100.000	100.008	2.343	8.262	1.92		

PN	US/MH Name	Infil. Flow (l/s)	Infil. Vol (m³)	Maximum Vol (m³)	Pipe Flow (l/s)	Status
1.000	MH 01			33.730	12.2	FLOOD
1.001	MH02			27.833	13.2	FLOOD
1.002	MH03			11.162	16.2	FLOOD

5 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for Storm

Simulation Criteria

Areal Reduction Factor	1.000	Additional Flow - % of Total Flow	0.000
Hot Start (mins)	0	MADD Factor * 10m³/ha Storage	2.000
Hot Start Level (mm)	0	Inlet Coeffiecient	0.800
Manhole Headloss Coeff (Global)	0.500	Flow per Person per Day (l/per/day)	0.000
Foul Sewage per hectare (l/s)	0.000		

Number of Input Hydrographs 0 Number of Offline Controls 0 Number of Time/Area Diagrams 0
Number of Online Controls 0 Number of Storage Structures 0 Number of Real Time Controls 0

Synthetic Rainfall Details

Rainfall Model	FSR	M5-60 (mm) 18.700	Cv (Summer) 0.750
Region	England and Wales	Ratio R 0.345	Cv (Winter) 0.840

Margin for Flood Risk Warning (mm) 0.0 DVD Status OFF
Analysis Timestep Fine Inertia Status OFF
DTS Status ON

Profile(s)	Summer and Winter
Duration(s) (mins)	15, 30, 60, 120, 180, 240, 360, 480, 600, 720, 960, 1440, 2160, 2880, 4320, 5760, 7200, 8640, 10080
Return Period(s) (years)	1, 2, 5, 10, 30, 100
Climate Change (%)	40, 40, 40, 40, 40, 40

PN	US/MH Name	Event	US/CL (m)	Water Level (m)	Surcharged Depth (m)	Flooded Volume (m³)	Flow / Cap.	Overflow (l/s)	Total Overflow Vol(m³)
1.000	MH 01	120 minute 5 year Winter I+40%	100.000	100.047	1.447	46.624	1.53		
1.001	MH02	120 minute 5 year Winter I+40%	100.000	100.040	1.765	39.562	1.60		
1.002	MH03	30 minute 5 year Winter I+40%	100.000	100.016	2.351	15.584	1.93		

PN	US/MH Name	Infil. Flow (l/s)	Infil. Vol (m³)	Maximum Vol (m³)	Pipe Flow (l/s)	Status
1.000	MH 01			48.315	12.2	FLOOD
1.001	MH02			41.685	13.3	FLOOD
1.002	MH03			18.484	16.2	FLOOD

10 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for Storm

Simulation Criteria

Areal Reduction Factor	1.000	Additional Flow - % of Total Flow	0.000
Hot Start (mins)	0	MADD Factor * 10m³/ha Storage	2.000
Hot Start Level (mm)	0	Inlet Coeffiecient	0.800
Manhole Headloss Coeff (Global)	0.500	Flow per Person per Day (l/per/day)	0.000
Foul Sewage per hectare (l/s)	0.000		

Number of Input Hydrographs 0 Number of Offline Controls 0 Number of Time/Area Diagrams 0
Number of Online Controls 0 Number of Storage Structures 0 Number of Real Time Controls 0

Synthetic Rainfall Details

Rainfall Model	FSR	M5-60 (mm)	18.700
Region	England and Wales	Ratio R	0.345
Cv (Summer)	0.750		
Cv (Winter)	0.840		

Margin for Flood Risk Warning (mm) 0.0 DVD Status OFF
Analysis Timestep Fine Inertia Status OFF
DTS Status ON

Profile(s)	Summer and Winter
Duration(s) (mins)	15, 30, 60, 120, 180, 240, 360, 480, 600, 720, 960, 1440, 2160, 2880, 4320, 5760, 7200, 8640, 10080
Return Period(s) (years)	1, 2, 5, 10, 30, 100
Climate Change (%)	40, 40, 40, 40, 40, 40

PN	US/MH Name	Event	US/CL (m)	Water Level (m)	Surcharged Depth (m)	Flooded Volume (m³)	Flow / Cap.	Overflow (l/s)	Total Overflow Vol(m³)
1.000	MH 01	180 minute 10 year Winter I+40%	100.000	100.061	1.461	60.588	1.53		
1.001	MH02	120 minute 10 year Winter I+40%	100.000	100.052	1.777	52.174	1.61		
1.002	MH03	30 minute 10 year Winter I+40%	100.000	100.022	2.357	21.837	1.93		

PN	US/MH Name	Infil. Flow (l/s)	Infil. Vol (m³)	Maximum Vol (m³)	Pipe Flow (l/s)	Status
1.000	MH 01			62.279	12.2	FLOOD
1.001	MH02			54.140	13.3	FLOOD
1.002	MH03			24.736	16.2	FLOOD

30 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for Storm

Simulation Criteria

Areal Reduction Factor	1.000	Additional Flow - % of Total Flow	0.000
Hot Start (mins)	0	MADD Factor * 10m³/ha Storage	2.000
Hot Start Level (mm)	0	Inlet Coeffiecient	0.800
Manhole Headloss Coeff (Global)	0.500	Flow per Person per Day (l/per/day)	0.000
Foul Sewage per hectare (l/s)	0.000		

Number of Input Hydrographs 0 Number of Offline Controls 0 Number of Time/Area Diagrams 0
Number of Online Controls 0 Number of Storage Structures 0 Number of Real Time Controls 0

Synthetic Rainfall Details

Rainfall Model	FSR	M5-60 (mm)	18.700
Region	England and Wales	Ratio R	0.345
Cv (Summer)	0.750		
Cv (Winter)	0.840		

Margin for Flood Risk Warning (mm) 0.0 DVD Status OFF
Analysis Timestep Fine Inertia Status OFF
DTS Status ON

Profile(s)	Summer and Winter
Duration(s) (mins)	15, 30, 60, 120, 180, 240, 360, 480, 600, 720, 960, 1440, 2160, 2880, 4320, 5760, 7200, 8640, 10080
Return Period(s) (years)	1, 2, 5, 10, 30, 100
Climate Change (%)	40, 40, 40, 40, 40, 40

PN	US/MH Name	Event	US/CL (m)	Water Level (m)	Surcharged Depth (m)	Flooded Volume (m³)	Flow / Cap.	Overflow (l/s)	Total Overflow Vol(m³)
1.000	MH 01	180 minute 30 year Winter I+40%	100.000	100.087	1.487	87.124	1.53		
1.001	MH02	180 minute 30 year Winter I+40%	100.000	100.077	1.802	77.007	1.61		
1.002	MH03	60 minute 30 year Winter I+40%	100.000	100.035	2.370	35.234	1.93		

PN	US/MH Name	Infil. Flow (l/s)	Infil. Vol (m³)	Maximum Vol (m³)	Pipe Flow (l/s)	Status
1.000	MH 01			88.794	12.2	FLOOD
1.001	MH02			79.079	13.4	FLOOD
1.002	MH03			38.134	16.3	FLOOD

100 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for Storm

Simulation Criteria

Areal Reduction Factor	1.000	Additional Flow - % of Total Flow	0.000
Hot Start (mins)	0	MADD Factor * 10m³/ha Storage	2.000
Hot Start Level (mm)	0	Inlet Coeffiecient	0.800
Manhole Headloss Coeff (Global)	0.500	Flow per Person per Day (l/per/day)	0.000
Foul Sewage per hectare (l/s)	0.000		

Number of Input Hydrographs 0 Number of Offline Controls 0 Number of Time/Area Diagrams 0
Number of Online Controls 0 Number of Storage Structures 0 Number of Real Time Controls 0

Synthetic Rainfall Details

Rainfall Model	FSR	M5-60 (mm)	18.700
Region	England and Wales	Ratio R	0.345
Cv (Summer)	0.750		
Cv (Winter)	0.840		

Margin for Flood Risk Warning (mm) 0.0 DVD Status OFF
Analysis Timestep Fine Inertia Status OFF
DTS Status ON

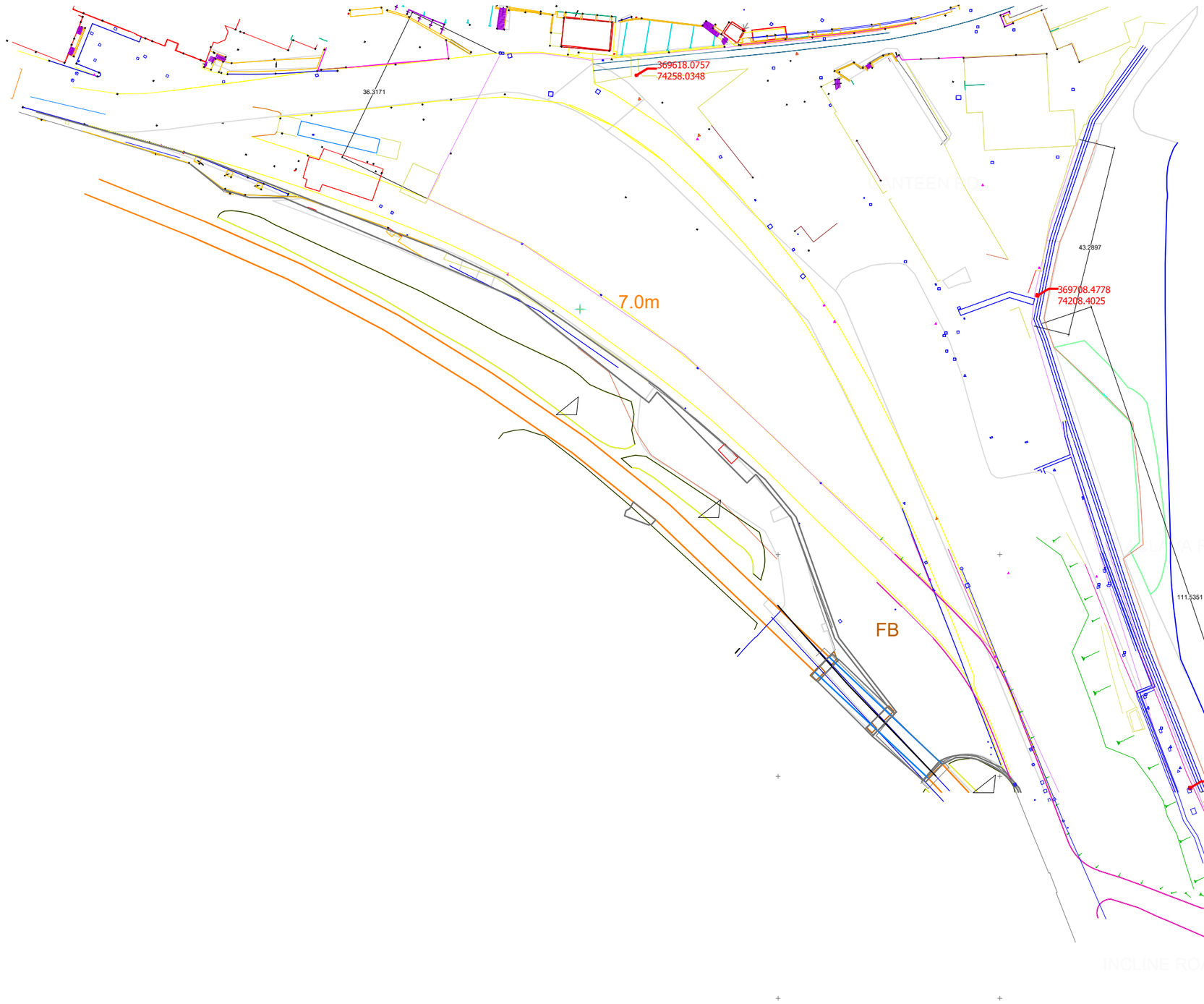
Profile(s)	Summer and Winter
Duration(s) (mins)	15, 30, 60, 120, 180, 240, 360, 480, 600, 720, 960, 1440, 2160, 2880, 4320, 5760, 7200, 8640, 10080
Return Period(s) (years)	1, 2, 5, 10, 30, 100
Climate Change (%)	40, 40, 40, 40, 40, 40

PN	US/MH Name	Event	US/CL (m)	Water Level (m)	Surcharged Depth (m)	Flooded Volume (m³)	Flow / Cap.	Overflow (l/s)	Total Overflow Vol(m³)
1.000	MH 01	240 minute 100 year Winter I+40%	100.000	100.126	1.526	125.909	1.53		
1.001	MH02	240 minute 100 year Winter I+40%	100.000	100.113	1.838	112.757	1.62		
1.002	MH03	60 minute 100 year Winter I+40%	100.000	100.057	2.392	56.522	1.94		

PN	US/MH Name	Infil. Flow (l/s)	Infil. Vol (m³)	Maximum Vol (m³)	Pipe Flow (l/s)	Status
1.000	MH 01			127.595	12.2	FLOOD
1.001	MH02			114.875	13.4	FLOOD
1.002	MH03			59.421	16.3	FLOOD

Appendix D CCTV Survey Information

The surface water tie in manholes have been identified in a thick red line. I have also supplied the coordinates for the chamber.



5011-002-001 Peat Bay A3 @ 1-1000

Project details

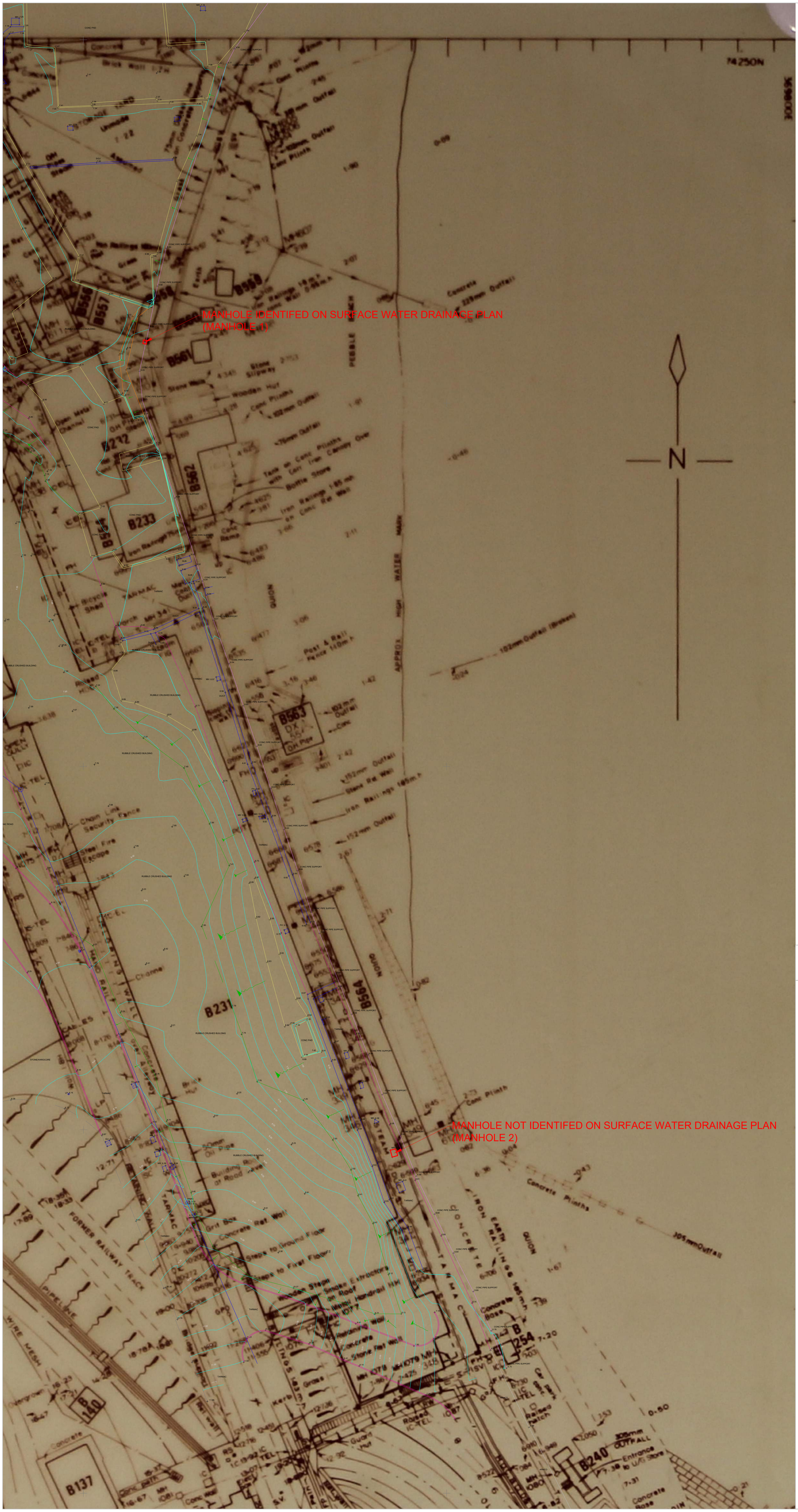
drawing name
5011(PEATBAY)-001-001

drawn by | date
JAMES GREEN | 18/05/2021

revision | scale
| A3@1:1000

PORTLAND HARBOUR AUTHORITY

Portland Port Business
Centre, Castletown,
Portland DT5 1PP

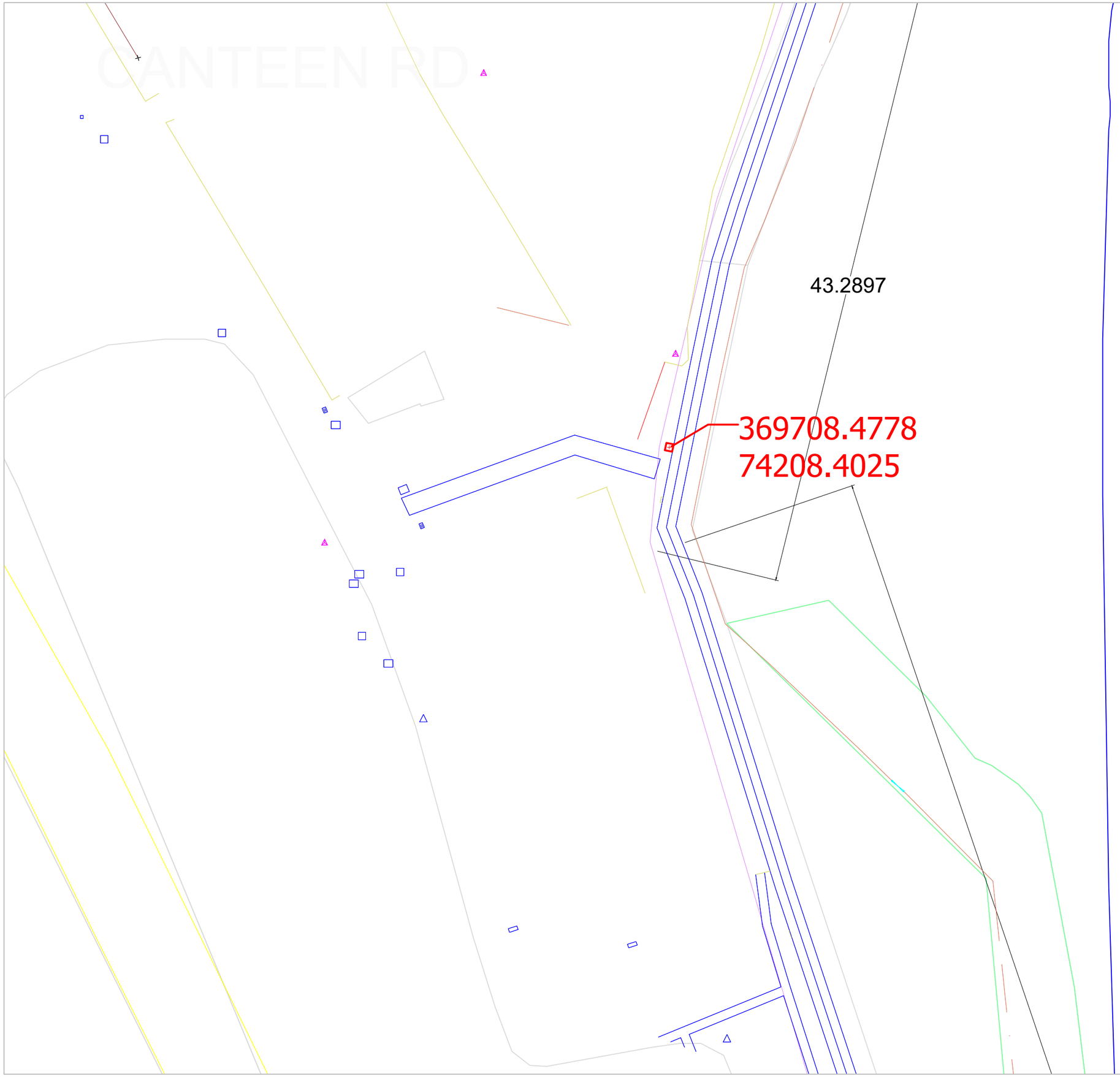


A1 Portrait

Project details

drawing name	JG TEMP External 2019
drawn by	
date	27.04.2020
revision	
scale	

Portland Port Business Centre, Castletown, Portland DT5 1PP



The surface water tie in manholes have been identified in a thick red line. I have also supplied the coordinates for the chamber.

5011-002-003 Eastern Outfall @ 1-250

Project details

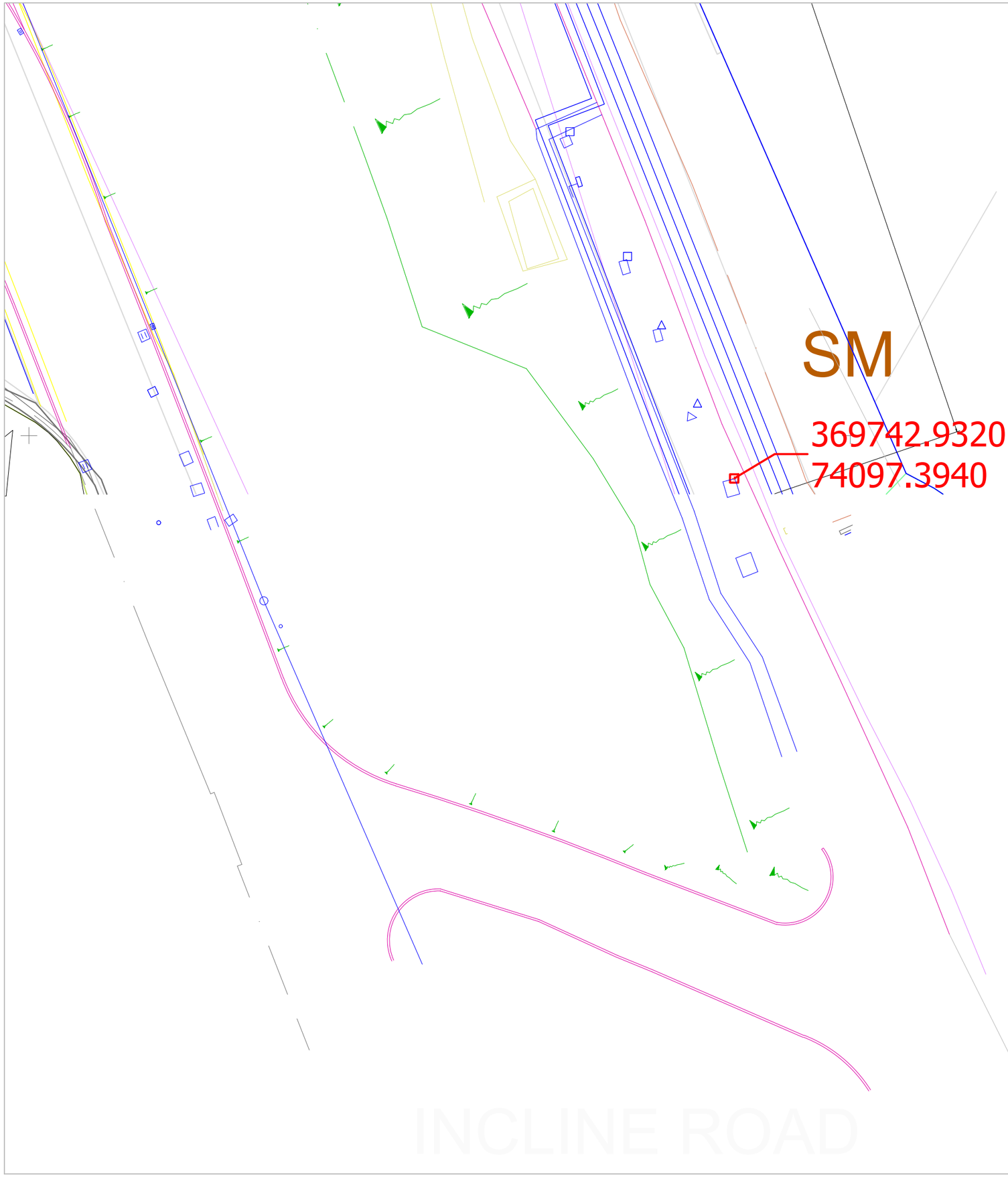
drawing name
5011(PEATBAY)-001-001

drawn by JAMES GREEN | 18/05/2021 date

revision | A3@1:250 scale

PORTLAND HARBOUR AUTHORITY

Portland Port Business
Centre, Castletown,
Portland DT5 1PP



The surface water tie in manholes have been identified in a thick red line. I have also supplied the coordinates for the chamber.

5011-002-002 Southern Outfall @ 1-250

Project details

drawing name
5011(PEATBAY)-001-001

drawn by JAMES GREEN | date 18/05/2021

revision | scale A3@1:250

PORTLAND HARBOUR AUTHORITY

Portland Port Business Centre, Castletown, Portland DT5 1PP

The surface water tie in manholes have been identified in a thick red line. I have also supplied the coordinates for the chamber.

369618.0757
74258.0348

Peat Bay Northern Outfall A3 @ 1-250 (2)

Project details

Untill line can be repaired and CCTV carried out, this is the assumed route of the pipeline.

drawing name
5011(PEATBAY)-001-001

drawn by JAMES GREEN | date 13/07/2021

revision 2 | scale

PORTLAND HARBOUR AUTHORITY

Portland Port Business Centre, Castletown, Portland DT5 1PP

Drainage Report

Prepared For

JAMES GREEN
PORTLAND PORT
PORTLAND
DORSET

Site

JAMES GREEN
PORTLAND PORT
PORTLAND
DORSET

THE BLOGGS LTD
Surveyor: C. Blogg

TheBloggsLTD@Gmail.com

[redacted]

Total Defects for Project

Total DRB Grades for Project

Portland Peat Bay - CCTV Survey Report : 04/01/21

Name :	THE BLOGGS LTD
Contact :	Christopher Blogg
Location :	49 Addison Rd
Town :	Southampton
Region :	Hampshire
Postcode :	SO31 7ER
Email :	TheBloggsLTD@Gmail.com
Contact Number :	[redacted]
Surveyor :	C. Blogg
Valid Certification No :	

Client Information

Name :	JAMES GREEN
Contact :	PORTLAND PORT
Location :	PORTLAND PORT
Town :	PORTLAND
Region :	DORSET
Postcode :	
Tel :	
Mobile :	
Email :	
Fax :	

Site Information

Name :	JAMES GREEN
Contact :	PORTLAND PORT
Location :	PORTLAND PORT
Town :	PORTLAND
Region :	DORSET
Postcode :	
Tel :	
Mobile :	
Email :	
Fax :	

Total Defects for Project

Total DRB Grades for Project

Report interpretation.

Overview:

Each section of the drainage system is allocated a score indicating areas that require attention. These areas are detailed in the Overview section on the following page and also at the bottom right of the first few pages. We use colour coding as an indicator of severity. Additional information concerning rehabilitation options/recomendations is included in the Overview page, which can also be used as an, "at a glance" indication of system condition. More in depth information for each section, Including images can be found later in the report. Grade indicators are as follows:

Grade A: Drain is serviceable no recommendations required

Grade B: There is an issue that might require remedial works

Grade C: There is a defect that requires remedial works, the drain is not serviceable.

Observations:

Each section of drainage reported on (manhole to manhole for example), contains detailed information about that drain and any observations made concerning condition are detailed below the header section. The observations are colour coded and given a severity score, with more significant defects being given a higher score, using a scale from 1 to 5 as detailed below:

Severity 1 to 2: These defects may require remedial monitoring

Severity 3: These defects probably require some form of remedial works

Severity 4 to 5: Defects that will require remedial repair or replacement

General:

The information provided is relevant at the time of survey. The coding system in this report is based on the Manual of Sewer Condition Classification, 5th edition (MSCC5) domestic codes (BS EN 13508-1:2003). This is the official standard for the water industry.

The severity system is based on significant experience in general practice and the 1 -5 grades represent the severity of individual defects: 5 representing a more serious defect.

Please feel free to contact us for further explanation or pricing for remedial works required.

Total Defects for Project

Total DRB Grades for Project

Overview

Section: 1 **From: MH1** **To: U/S**	Grade C	**DRB Grade: C** **Pipe Size: 300** **Material: Vitrified Clay (i.e. all clayware)** **Use: Surface Water**
Section: 2 **From: MH3** **To: D/S**	Grade A	**DRB Grade: A** **Pipe Size: 300** **Material: Vitrified Clay (i.e. all clayware)** **Use: Surface Water**
Section: 3 **From: MH1** **To: MH2**	Grade C	**DRB Grade: C** **Pipe Size: 300** **Material: Vitrified Clay (i.e. all clayware)** **Use: Surface Water**
Section: 4 **From: MH2** **To: OUTFALL**		**DRB Grade: C** **Pipe Size: 300** **Material: Vitrified Clay (i.e. all clayware)** **Use: Surface Water**

Total Defects for Project

Total DRB Grades for Project

Site: PORTLAND PORT, PORTLAND

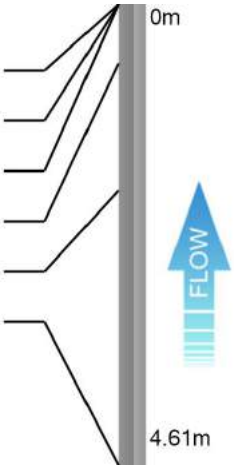
Section 1

Client:	Location (Street Name):	City/Town/Village	Cust Job Ref.	Surveyors Name:	Date:
JAMES GREEN	PORTLAND PORT	PORTLAND		C. Blogg	04/01/2021

Start Node Ref:	MH1	Finish Node Ref:	U/S	Direction:	U	Height/Dia:	300
Start Node Depth:	2.50	Finish Node Depth:	0.00	Use:	S	Shape:	C
Start Node Coordinate:		Finish Node Coordinate:		Material:	VC	Cleaned	N

Drain Type	Lining Type	Lining Mat.	Year Const.	Weather	Flow Cont.	Length	Remarks
A				D	N	4.61	

Position	Code	Description	CD	Pic	Video Ref
00.00m	MH	Start node type, manhole		0_0	
00.00m	WL	Water level 0%			0:00:00
00.00m	JDL	Joint displaced large		0_2	0:00:20
00.59m	H	Hole in drain/sewer 11-02		0_3	0:02:53
01.86m	R	Roots		0_4	0:03:21
04.61m	MHF	Finish node type, manhole		0_99	



Total Defects for section

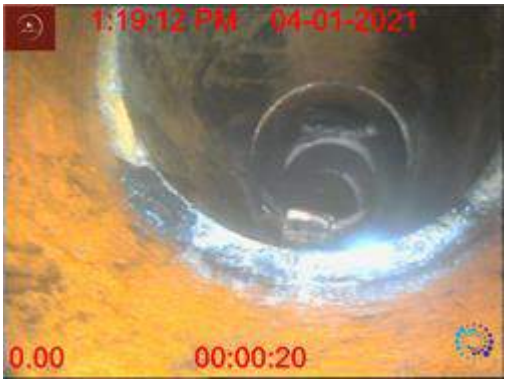
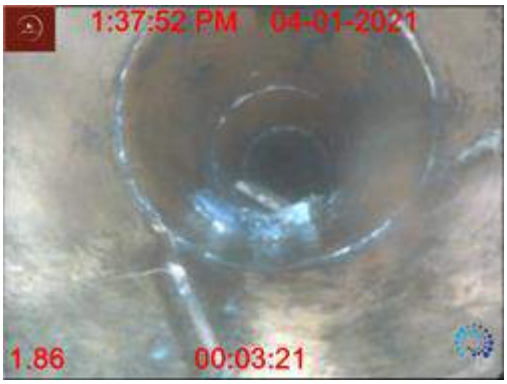
0	0	1	2	0

DRB Grade for Section

C

Descriptive Report with Remarks and Observation Images

Section 1

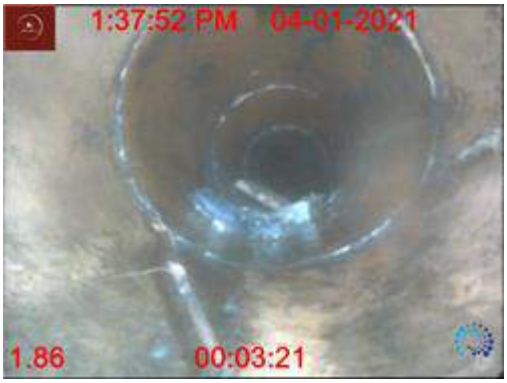
Pos	Video Ref	Code	Description	Image
00.00m		MH	Start node type, manhole MH1	Image Provided - Ref: 0_0 
00.00m	0:00:00	WL	Water level: 0% Height/Diameter	
00.00m	0:00:20	JDL	Joint displaced large - Severity 4	Image Provided - Ref: 0_2 
00.59m	0:02:53	H	Hole in drain/sewer from 11 o'clock to 02 o'clock - Severity 4	Image Provided - Ref: 0_3 

Total Defects for section

0 0 1 2 0

DRB Grade for Section

C

Pos	Video Ref	Code	Description	Image
01.86m	0:03:21	R	Roots - Severity 3	Image Provided - Ref: 0_4 
04.61m		MHF	Finish node type, manhole MH2	Image Provided - Ref: 0_9999 

Total Defects for section

0 0 1 2 0

DRB Grade for Section

C

Site: PORTLAND PORT, PORTLAND

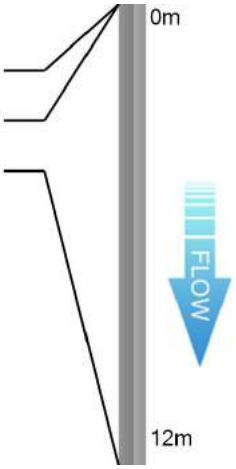
Section 2

Client:	Location (Street Name):	City/Town/Village	Cust Job Ref.	Surveyors Name:	Date:
JAMES GREEN	PORTLAND PORT	PORTLAND		C. Blogg	04/01/2021

Start Node Ref:	MH3	Finish Node Ref:	D/S	Direction:	D	Height/Dia:	300
Start Node Depth:	3.20	Finish Node Depth:	0.00	Use:	S	Shape:	C
Start Node Coordinate:		Finish Node Coordinate:		Material:	VC	Cleaned	N

Drain Type	Lining Type	Lining Mat.	Year Const.	Weather	Flow Cont.	Length	Remarks
A				D	N	12	

Position	Code	Description	CD	Pic	Video Ref
00.00m	MH	Start node type, manhole			
00.00m	WL	Water level 0%			0:00:00
12.00m	MHF	Finish node type, manhole			



Total Defects for section

0 0 0 0 0

DRB Grade for Section

A

Descriptive Report with Remarks and Observation Images

Section 2

Pos	Video Ref	Code	Description	Image
00.00m		MH	Start node type, manhole MH3	
00.00m	0:00:00	WL	Water level: 0% Height/Diameter	
12.00m		MHF	Finish node type, manhole D/S	

Site: PORTLAND PORT, PORTLAND

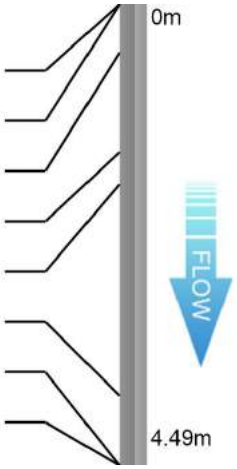
Section 3

Client:	Location (Street Name):	City/Town/Village	Cust Job Ref.	Surveyors Name:	Date:
JAMES GREEN	PORTLAND PORT	PORTLAND		C. Blogg	04/01/2021

Start Node Ref:	MH1	Finish Node Ref:	MH2	Direction:	D	Height/Dia:	300
Start Node Depth:	3.30	Finish Node Depth:	0.00	Use:	S	Shape:	C
Start Node Coordinate:		Finish Node Coordinate:		Material:	VC	Cleaned	Y

Drain Type	Lining Type	Lining Mat.	Year Const.	Weather	Flow Cont.	Length	Remarks
A				D	N	4.49	

Position	Code	Description	CD	Pic	Video Ref
00.00m	MH	Start node type, manhole		2_0	
00.00m	WL	Water level 0%			0:00:00
00.47m	H	Hole in drain/sewer 12-01		2_2	0:00:22
01.44m	CM	Cracks, multiple 12-12		2_3	0:00:48
01.75m	H	Hole in drain/sewer 11-02		2_4	0:01:08
03.81m	H	Hole in drain/sewer 10-02		2_5	0:01:08
04.49m	BJ	Broken pipe 06-11 at joint		2_6	0:02:09
04.49m	MHF	Finish node type, manhole		2_99	



Total Defects for section

0	1	0	4	0

DRB Grade for Section

C

Descriptive Report with Remarks and Observation Images

Section 3

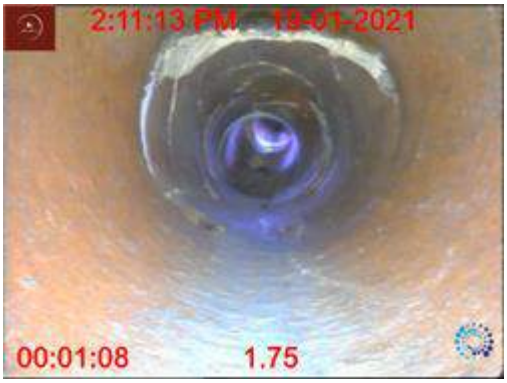
Pos	Video Ref	Code	Description	Image
00.00m		MH	Start node type, manhole MH1	Image Provided - Ref: 2_0 
00.00m	0:00:00	WL	Water level: 0% Height/Diameter	
00.47m	0:00:22	H	Hole in drain/sewer from 12 o'clock to 01 o'clock - Severity 4	Image Provided - Ref: 2_2 
01.44m	0:00:48	CM	Cracks, multiple from 12 o'clock to 12 o'clock - Severity 2	Image Provided - Ref: 2_3 

Total Defects for section

0	1	0	4	0

DRB Grade for Section

C

Pos	Video Ref	Code	Description	Image
01.75m	0:01:08	H	Hole in drain/sewer from 11 o'clock to 02 o'clock - Severity 4	Image Provided - Ref: 2_4 
03.81m	0:01:08	H	Hole in drain/sewer from 10 o'clock to 02 o'clock - Severity 4	Image Provided - Ref: 2_5 
04.49m	0:02:09	BJ	Broken pipe from 06 o'clock to 11 o'clock at joint - Severity 4	Image Provided - Ref: 2_6 
04.49m		MHF	Finish node type, manhole MH2	Image Provided - Ref: 2_9999 

Total Defects for section

0 1 0 4 0

DRB Grade for Section

C

Site: PORTLAND PORT, PORTLAND

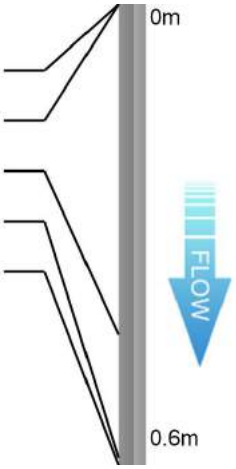
Section 4

Client:	Location (Street Name):	City/Town/Village	Cust Job Ref.	Surveyors Name:	Date:
JAMES GREEN	PORTLAND PORT	PORTLAND		C. Blogg	04/01/2021

Start Node Ref:	MH2	Finish Node Ref:	OUTFALL	Direction:	D	Height/Dia:	300
Start Node Depth:	0.50	Finish Node Depth:	0.00	Use:	S	Shape:	C
Start Node Coordinate:		Finish Node Coordinate:		Material:	VC	Cleaned	Y

Drain Type	Lining Type	Lining Mat.	Year Const.	Weather	Flow Cont.	Length	Remarks
A				D	N	0.6	

Position	Code	Description	CD	Pic	Video Ref
00.00m	MH	Start node type, manhole		3_0	
00.00m	WL	Water level 0%			0:00:00
00.43m	B	Broken pipe 04-07		3_2	0:00:19
00.59m	MC	Material of drain/sewer changes		3_3	0:00:36
00.60m	OCF	Finish node type, other special chamber		3_99	



Total Defects for section

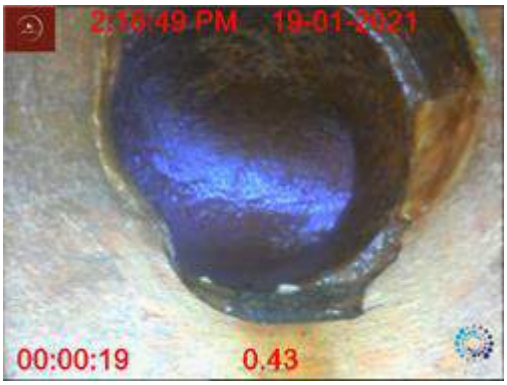
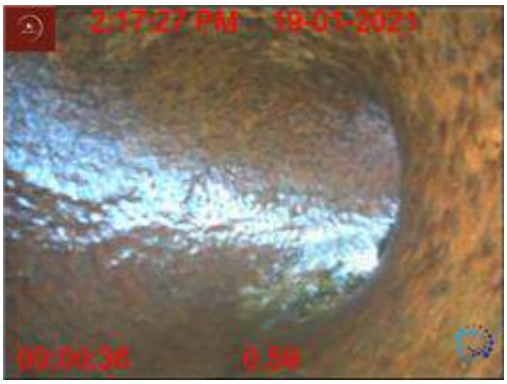
0 0 0 1 0

DRB Grade for Section

C

Descriptive Report with Remarks and Observation Images

Section 4

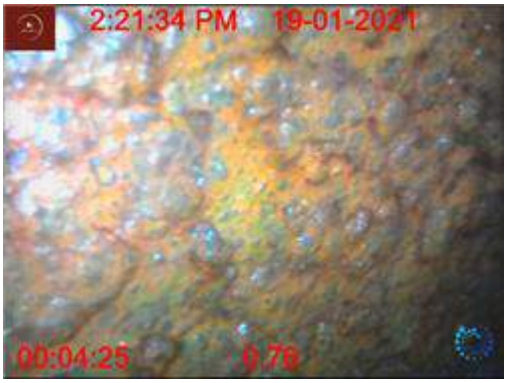
Pos	Video Ref	Code	Description	Image
00.00m		MH	Start node type, manhole MH2	Image Provided - Ref: 3_0 
00.00m	0:00:00	WL	Water level: 0% Height/Diameter	
00.43m	0:00:19	B	Broken pipe from 04 o'clock to 07 o'clock - Severity 4	Image Provided - Ref: 3_2 
00.59m	0:00:36	MCCI	Material of pipe changes to Cast Iron	Image Provided - Ref: 3_3 

Total Defects for section

0 0 0 1 0

DRB Grade for Section

C

Pos	Video Ref	Code	Description	Image
00.60m		OCF	Finish node type, other special chamber OUTFALL UNABLE TO TURN CORNER. AS UNSAFE TO DRIVE CAMERA ANY FURTHER AS RIGHT ON THE OUTFALL	Image Provided - Ref: 3_9999 

Total Defects for section

0 0 0 1 0

DRB Grade for Section

C

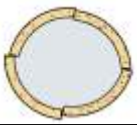
A guide to defects and other observations in drainage systems

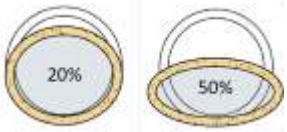
More detailed information can be found in the National Standard (BS EN 13508-1:2003) and in the Manual of Sewer Condition Classification (MSCC) 5th Edition, written by the Water Research Centre (WRc).

Use	
Code	**Description**
C	Combined
F	Foul
S	Surface Water
T	Trade Effulent
W	Culverted Watercourse
Z	Other

Common Materials	
Code	**Description**
VC	Vitrified Clay
PVC	Polyvinyl Chloride
CO	Concrete
CI	Cast Iron
PF	Pitch Fibre
PE	Polyethylene
DI	Ductile Iron

Start Node	Description	Finish Node
MH	Manhole	MHF
IC	Inspection Chamber	ICF
GY	Gulley	GYF
RE	Rodding Eye	REF
SK	Soakaway	SKF
BN	Buchan Trap	BNF
BR	Major Connection without Ref	BRF
CP	Cacth Pit	CPF
OC	Other Special Chamber	OCF
OF	Outfall	OFF
OS	Oil Seperator	OSF
WR	Major Connection without mh	WRF
LH	Lamphole	LHF

Code	Observation	Description	Attributes	
B	Broken	Pieces pipe have visibly moved	Defined by clock references. Associated with deformity in rigid pipe	
CC CL CM CR	Cracks	Cracks are break lines that are not visibly open	Defined by clock reference position/s. Longitudinal and radiating cracks attract only one clock reference	
CN	Connection	Lateral pipe has been connected after original construction	Described by clock reference position and diameter	

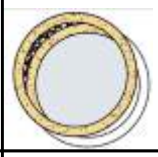
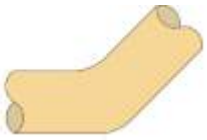
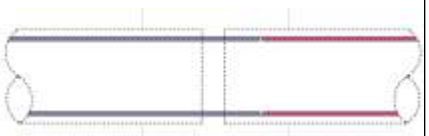
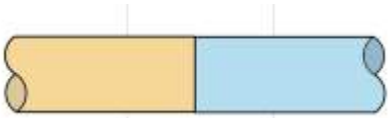
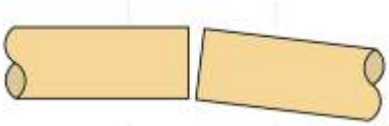
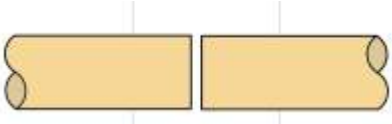
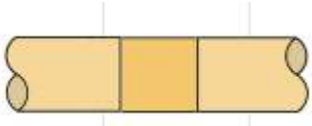
CX(I)	Defective Connection (Intruding)	Defective by intrusion or damage due to factors including: cracks, fractures, obstruction, position etc	Described by clock reference position and diameter (+ % intrusion)	
CU	Loss of Vision	Lens of camera is obscured by debris, water etc. Operator is unable to see drain clearly	'W' can be added if loss of vision is due to wate	
D	Deformed	Pipe has lost its structure	Described by percentage loss of height or width. Recorded in 5% increments	
DEE	Deposits Encrustation	Eg. Attached scale deposits evident	Described by clock referenced position and percentage loss of cross-sectional area (5% increments)	
DEG	Deposits Grease	Attached grease deposits evident	Described by clock referenced position and percentage loss of cross-sectional area (5% increments)	
DER DES	Deposits Coarse/Fine	Settled deposits on the invert of the pipe.	Described by percentage loss of height or diameter. Recorded in 5% increments.	
FC FL FM FR	Fractures	Fractures are visibly open. Pieces of pipe have not moved	Defined by clock reference position/s. Longitudinal and radiating fractures attract only one clock reference	
H	Holes	Section of pipe fabric is missing	Defined by clock reference location. Normally two clock references	
I	Infiltration	Water is infiltrating the pipe, normally via a joint but could be via another defect	Can be described in Remarks using terms such as Seeper, Dripper and Runner	
JDL	Joint Displaced Large	Pipe has moved at joint, perpendicular to axis of pipe	More than 1.5 times the pipe wall thickness must be visible	

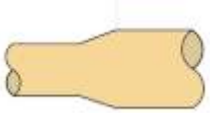
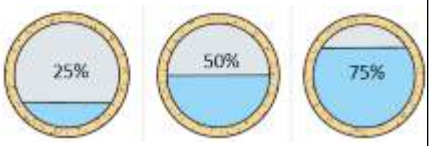
Total Defects for section

0	0	0	1	0

DRB Grade for Section

C

JDM	Joint Displaced Medium	Pipe has moved at joint, perpendicular to axis of pipe	Between 1 and 1.5 times the pipe wall thickness must be visible	
JN	Junction	Lateral pipe was installed at construction	Described by clock reference position and diameter	
JX	Defective Junction	Lateral pipe was installed at construction but is defective in some way	Joint can be defective due to factors including: cracks, fractures, obstruction, position etc	
LD **LU** **LL** **LR**	Line Deviation	LD = Line Down, LU = Line Up, LL = Line Left, LR = Line Right. Not related to CIPP lining.	Additional modifiers are added: Q = Quarter (22.5), H = Half (45), F = Full (90). In degrees.	
LC	Lining Changes	If the drain is lined, the lining material has changed	Position of lining material change	
MC	Material Change	The pipe material has changed	Position of change is noted. Type of material change can be defined	
OB	Obstruction/Obstacle	An obstruction or obstacle is affecting the flow through the pipe	Described in percentage loss of cross-sectional area	
OJL	Open Joint Large	Pipe has moved at joint, along the axis of pipe	More than 1.5 times the pipe wall thickness must be visible	
OJM	Open Joint Medium	Pipe has moved at joint, along the axis of pipe	Between 1 and 1.5 times the pipe wall thickness must be visible	
PC	Pipe Length Changes	Length of individual pipe changes	New length described at this position	

R	Roots	Evidence of root ingress	Roots will normally infiltrate via bad joints, cracks, fractures, breaks etc	
REM	Remark	General remark	Used for additional information	
S	Surface Damage	This might include corrosion, spalling and chemical attack	Position only. Additional information can be added in Remarks	
SA	Survey Abandoned	Used when a survey cannot continue for any reason	The reason for abandoning a survey should be noted in the remarks area	
SC	Shape Changes	Dimension of drain changes	Diameter dimension change recorded. Second dimension is recorded for no circular pipe changes	
SR	Sealing Ring	Sealing ring intrudes into pipe at joint	Described by clock reference position	
V	Vermin	Evidence of Vermin in pipe	Can also be used for evidence within manhole etc	
WL	Water Level	Used to record changes in water level. Always shown at the beginning of every survey, if dry noted as 00.	Described by percentage of height or diameter. Recorded in 5% increments	
XP	Collapsed	Drain is suffering from complete loss of structural integrity. Always followed by SA - Survey Abandoned	Percentage loss of cross-sectional area is recorded. Other related structural defects are not recorded