Prestatyn

OLD FIRE STATION

Drainage Strategy Report

107011-RP-D-0001

Rev: P01

May 2024

JPS CIVIL + STRUCTURAL ENGINEERS

Document History

Job Number: 107011		Document Ref: RP-D-0001		
P02	Updated to Latest Proposals	RH	JP	13.05.2024
P01	Drainage Strategy	RH	JP	10.05.2024
Revision	Purpose Description	Originated	Authorised	Date

Contents

1 Introduction

1.1 Commission

In April 2024, Cassidy + Ashton appointed JP Structural Design (JPS) on behalf of the Nant Hall Developments, to undertake this Drainage Strategy Report in support of a pre Planning Application submission for the redevelopment of the Old Fire House in Prestatyn to incorporate 18 apartments / 5 Holiday lets and commercial spaces.

1.2 Existing Site

The site covers an area south of Nant Hall Road, which was previously utilised as Council offices following its conversion from the old Fire Station. The site covers an area of approximately 1,670 m^2 as shown on the site information drawing in Appendix A. The site is bounded by Nant Hall Road to the north, the unnamed Ty Nant access road to the east & south. Private dwellings and the public Toilet block form the western boundary. The site is subsequently a non-uniform shape within an urban environment within significant falls / steps across it equating to approximately a 1.8m level difference South to North.

1.3 Existing Drainage

On-site investigations suggest that the site is served a mixture of Foul and surface water systems – the RWPs on the front elevation also discharge direct to the highway.

There are Public Foul & Surface Water Sewer systems located within Nant Hall Road and the Ty Nant Access road, that the site appears to have multiple connections to. Appendix B contains a copy of the public sewer record drawing, and following basic on-site investigations, Appendix C contains an Existing Drainage drawing depicting the current arrangements as best believed to exist.

1.4 Existing Flood Design

As stated above, the site covers an area of approximately 0.167 Ha, of which approximately 87% is currently impermeable surfacing. In accordance with the NRW Developers Advice Maps (shown in Appendix A, the site is located partially within Flood Zone C1 – areas of the floodplain which are developed and served by significant infrastructure including flood defences. The majority of the site is located outside of the extreme flood extent – an area considered to have a less than 0.1% annual probability of flooding.

1.5 TAN 15

TAN 15 states that highly vulnerable and less vulnerable development can be considered in Flood Zone C1 subject to the application of the justification test and acceptability of consequences.

1.5.1 Justification

Development will be justified if it can be demonstrated that:

i. Its location in Zone C is necessary to assist, or be a part of, a local authority regeneration initiative or a local authority strategy required to sustain an existing settlement; **or**,

ii. Its location in Zone C is necessary to contribute to key employment objectives supported by the local authority, and other key partners, to sustain an existing settlement or region;

and,

iii. It concurs with the aims of PPW and meets the definition of previously developed land;

and,

iv. The potential consequences of a flooding event for the particular type of development have been considered, and in terms of the criteria contained and found to be acceptable.

1.5.2 Conclusion

It is considered that the justification test will be satisfied as the development would support regeneration of Prestatyn Town centre initiatives and as it constitutes the redevelopment of an existing brownfield site with commercial use, it therefore meets the definition of previously developed land. A more detailed review of the criteria can be undertaken in due course, but it should be noted that the ground floor contains commercial developments which can incorporate flood resistant measures and therefore is not considered to be of concern.

1.6 Proposed Development

The scheme consists of the redevelopment of the Old Fire Station with the construction of an extension residential block.

Based upon the latest development plans the final impermeable area generated by the proposals will be approximately 0.134 Ha as shown on the impermeable area plan. Appendix D contains the site proposals, Appendix E the preliminary drainage layout and Appendix F the surface water calculations.

2 Drainage Proposals

2.1 Foul Drainage

The foul drainage peak discharge generated from the site will likely increase following completion of the scheme with the creation of domestic apartments and commercial areas as opposed to office space and welfare facilities.

However utilising the discharge units method, this is anticipated of having a maximum peak flow of 4 l/s on an intermittent usage, although this perhaps doesn't take into account that not all of the building may be occupied at any given time.

FEATURE	DISCHARGE UNITS	QUANTITY	TOTAL
WHB	0.3	32	9.6
SHOWER	0.4	24	9.6
SINGLE URINAL	0.4	0	0
SLAB URINAL	0.2	0	0
BATH	1.3	0	0
SINK	1.3	2	2.6
DISHWASHER	0.2	1	0.2
WASHING MACHINE	0.9	0	0
WC	1.6	32	51.2
FLOOR GULLY	1.0	0	0
BIDET	0.3	0	0

FREQUANCY FACTOR	K
Intermittent Use	0.5
Frequent Use	0.7
Congested Use	1.0
Special Use	1.2

DISCHARGE UNITS	73.2
FREQ FACTOR (k)	0.5
PEAK FLOW Q (L/Sec)	**4.28**

For the foul design proposals, we would therefore advocate a new separate foul drainage system is designed to serve the proposed development and connected to the existing foul network serving the site.

2.2 Surface Water Drainage

It is acknowledged that the satisfactory collection, control and discharge of storm water is now a principle planning and design consideration. Part H of the Building Regulations 2002 recommends that surface water run-off shall discharge to one of the following, listed in order of priority:

a) an adequate soakaway or some other adequate infiltration system, or where that is not reasonably practicable,

b) a watercourse, or, where that is not reasonably practicable,

c) a sewer.

It is necessary to identify the most appropriate method of controlling and discharging surface water. The design should seek to improve the local run-off profile by using systems that can either attenuate run-off and reduce peak flow rates or positively impact on the existing flood profile. It is also acknowledged that this scheme will be subject to SAB Approval in due course.

2.3 Ground Infiltration Techniques

The site is expected to be underlain by sandy gravelly clays with water levels subject to seasonal and tidal variations. Infiltration rates would therefore be expected to be poor. Also due to the size and location of the site, it would also not be possible to position soakaways in keeping with the recommended spacings from buildings and roads.

As such disposal of surface water by infiltration methods was not considered a viable option for the scheme, although will be subject to ground investigation and in situ testing.

2.4 Discharge To Watercourse

There is not a watercourse adjacent to the site and subsequently a connection will not be achievable without crossing 3rd party land. We are therefore of the opinion that the only realistic means to drain the site is to maintain the existing connections (subject to condition) to the public surface water sewer network.

2.5 Surface Water Calculations

As the existing site is currently believed to utilise gravity sewers to dispose of surface water, we have developed the proposed drainage strategy on the assumption it will be acceptable for the site to continue to use this outlet.

As requested by the planning authority we have looked to reduce the site to greenfield run-off, however, working on 5 l/s/ha =

$Q = 0.167 \times 5 = 0.835$ l/s

As 2 l/s is generally considered an acceptable / practicable minimum figure to work to, we have therefore taken this as the proposed discharge rate for the site.

Therefore, the proposed surface water run-off generated by the development is to be attenuated on-site in a cellular structure, prior to a controlled discharge of 2 l/s into the existing public surface water sewer network. The cellular structure should be designed to provide attenuation for up to and including a 1 in 100 year storm event plus a 40% allowance for climatic change - it is anticipated that the structure would be required to provide a capacity of circa 55m^3, but this will be subject to detailed design based on site specific investigations and testing.

2.6 Sustainable Drainage

It is proposed that the car park will utilise permeable paving design to manage the water generated at source. The installation of permeable paving will also act as filters, removing many pollutants through collection and biodegradation before returning cleansed water to the natural environment - runoff from the roofs is considered to be a low risk in terms of pollution control, however due to the nature of the development (comprising predominantly conversion of existing building with an extension) it has not been possible to consider other measures such as green roofs or greywater systems. Providing Water butts to encourage an element of re-use is all not viable in an apartment development.

2.7 O&M Manual

During the final design & construction stage, full details will be submitted and included in the O&M manuals to ensure the drainage system is regularly maintained with particular regards to the surface water system. This will include manufacturer's guidelines for maintenance and replacement as well as full details of the flow control device and means to operate the drain down features in a blockage situation. A draft copy is contained within Appendix G.

3 Conclusions

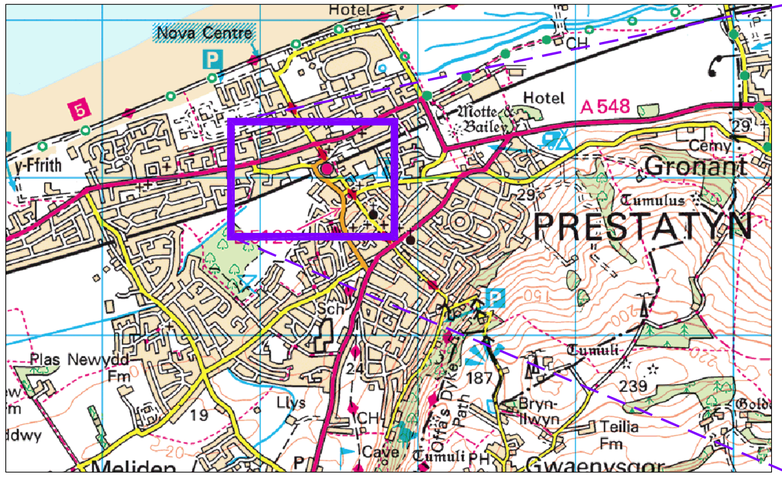
3.1 Conclusions

The proposed site is at an acceptable level of flood risk and there are suitable points of connection for the disposal of the foul and surface water run-off generated by the proposed development.

We would expect the proposed development to be free from general objections in respect to draining the site but anticipate that the use of infiltration techniques will not be possible. There will also be suitable conditions imposed to ensure that the drainage proposals are designed and constructed in accordance with relevant statutory requirements.

4 Appendices

Appendix A – Site Information Drawing



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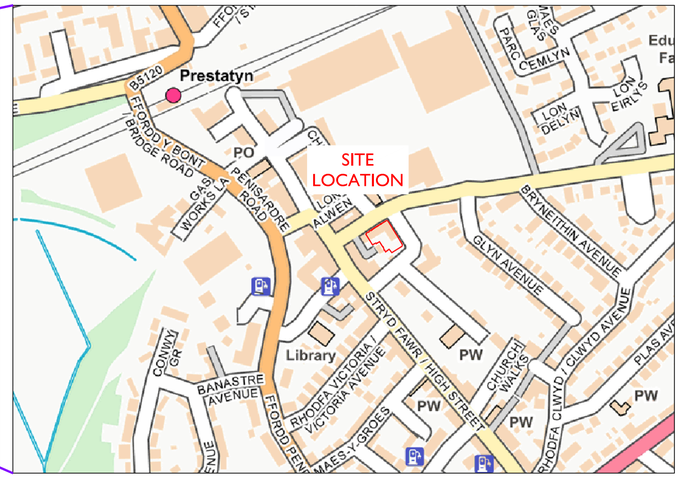

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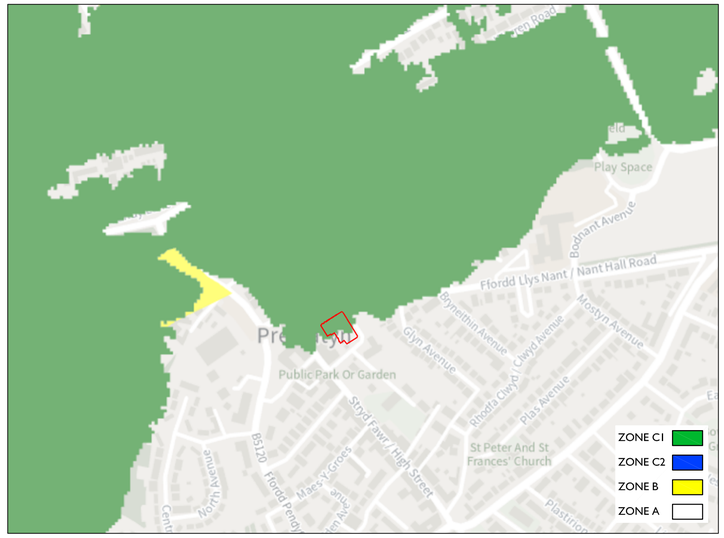
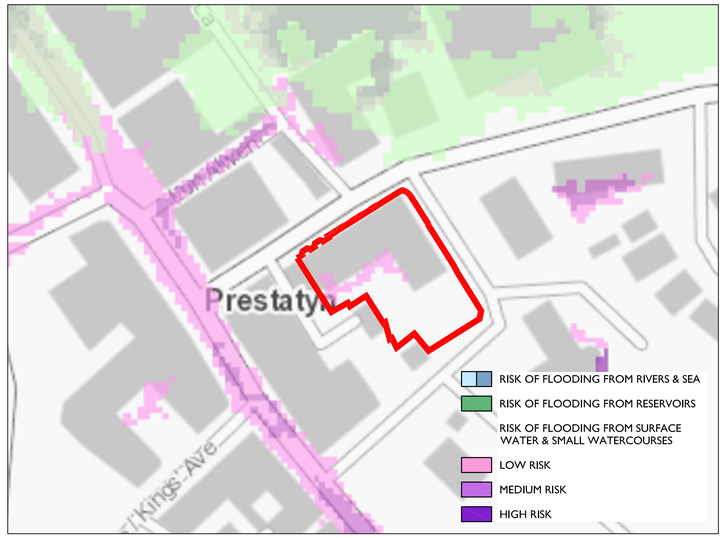


DEVELOPMENT ADVICE MAP
APPROX SCALE 1:5,000



FLOOD RISK MAP
APPROX SCALE 1:10,000

EXISTING SATELITE IMAGE
APPROX SCALE 1:500

PROPOSED / EXISTING IMPERMEABLE AREA
APPROX SCALE 1:250

SITE CO-ORDINATES

OS X (Eastings)	306635
OS Y (Northings)	382911
Nearest Post Code	LL19 9LL
Nat Grid	SJ066829 / SJ066582911

AREAS

- SITE BOUNDARY 1,670 SQ M
- EXISTING IMPERMEABLE AREA 1,460 SQ M
- EXISTING IMPERMEABLE AREA WHICH DOESN'T CONNECT 175 SQ M
- ADDITIONAL IMPERMEABLE AREA 130 SQ M
- EXISTING IMPERMEABLE AREA TO BE REMOVED 40 SQ M

REV	DESCRIPTION	BY	CHK	APR	DATE
P02	UPDATED TO LATEST PROPOSALS	RH	MM	JP	14.05.2024

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PURPOSE OF ISSUE	PRELIMINARY
STATUS	P
PROJECT	OLD FIRE STATION 6-8 NANT HALL ROAD PRESTATYN
TITLE	DRAINAGE SCHEME SITE INFORMATION
CLIENT	NANT HALL DEVELOPMENTS LTD

DRAWN BY	CHECKED BY	APPROVED BY
RH	MM	JP
DATE	SCALE (@ A1)	PROJECT NUMBER
10.05.2024	1:150	107011
DRAWING NUMBER		REV
1001		P02

Appendix B – Public Sewer Records

Dŵr Cymru
Welsh Water

Nant Hall Road Apartments

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
- Storm Overflow
- Rising main
- Gravity sewer
- Private sewer
- Private sewer subject to Sect. 104 adoption agreement
- 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

EXACT LOCATIONS OF ALL APPARATUS TO BE DETERMINED ON SITE.

Map Ref:	306676,382928
Map scale:	1:1250
Printed by:	Denning Kelly-Ann
Printed on:	10 Feb 2020

Appendix C – Existing Drainage Layout

THIS DRAWING HAS BEEN PRODUCED BY COMPARING INFORMATION FROM VARIOUS RECORD PLANS AGAINST THE TOPOGRAPHICAL SURVEY DATA OBTAINED. AS SUCH THE ACCURACY CANNOT BE GUARANTEED AND THE CONTRACTOR IS TO VERIFY THE EXISTING LAYOUT & LEVELS PRIOR TO COMMENCEMENT OF ANY DRAINAGE WORKS.

EXISTING DRAINAGE NOTES

THE LOCATION LINE & LEVEL OF ALL KNOWN EXISTING DRAINAGE PIPEWORK INDICATED ON THIS DRAWING IS APPROXIMATE AND FOR GUIDANCE PURPOSES ONLY.

KEY

- FWS — EXISTING FOUL WATER SEWER
- SWS — EXISTING SW SEWER
- CFS — EXISTING COMBINED SEWER
- HD — EXISTING HIGHWAY DRAIN
- FWS — EXISTING FOUL DRAIN
- SWS — EXISTING SW DRAIN
- CFS — EXISTING COMBINED FLOW DRAIN

NANT HALL ROAD

SJ06825801 CL Unk IL Unk
SJ06825850 CL Unk IL unk
SJ06826912 CL Unk IL Unk
SJ06826913 CL Unk IL Unk
SJ06826908 CL Unk IL Unk
SJ06826906 CL 5.32 IL Unk
SJ06826902 CL 5.39 IL Unk
SJ06826907 CL 5.36 IL 3.49
SJ06826905 CL 5.33 IL 3.43
SJ06825905 CL Unk IL Unk
SJ06825803 CL Unk IL Unk
EXISTING LAMPHOLE
RWP
RWPs TO THE FRONT ELEVATION DISCHARGE TO FOOTWAY OR ASSUMED DIRECT TO SEWER
EX MH a CL 5.87 IL 5.22
EX MH b CL 5.83 IL 5.305
EX MH c CL Unk IL Unk
EX MH d CL 5.78 IL 4.38
EX MH e CL 5.61 IL 5.06
EX MH f CL 5.53 IL 5.28
EX MH g CL 7.09 IL Unk
EX MH h CL 6.66 IL 5.41
ASSUMED CONNECTION
ASSUMED UNMAPPED SEWER MANHOLE CL Unk IL Unk
SJ06826815 CL Unk IL Unk
SJ06826910 CL 6.84 IL Unk
SJ06826909 CL 5.97 IL Unk
SJ06826806 CL Unk IL Unk
SJ06826805 CL 7.43 IL Unk
SJ06826801 CL Unk IL Unk
SJ06826808 CL Unk IL Unk
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REV	DESCRIPTION	BY	CHK	APR	DATE
-	-	-	-	-	-

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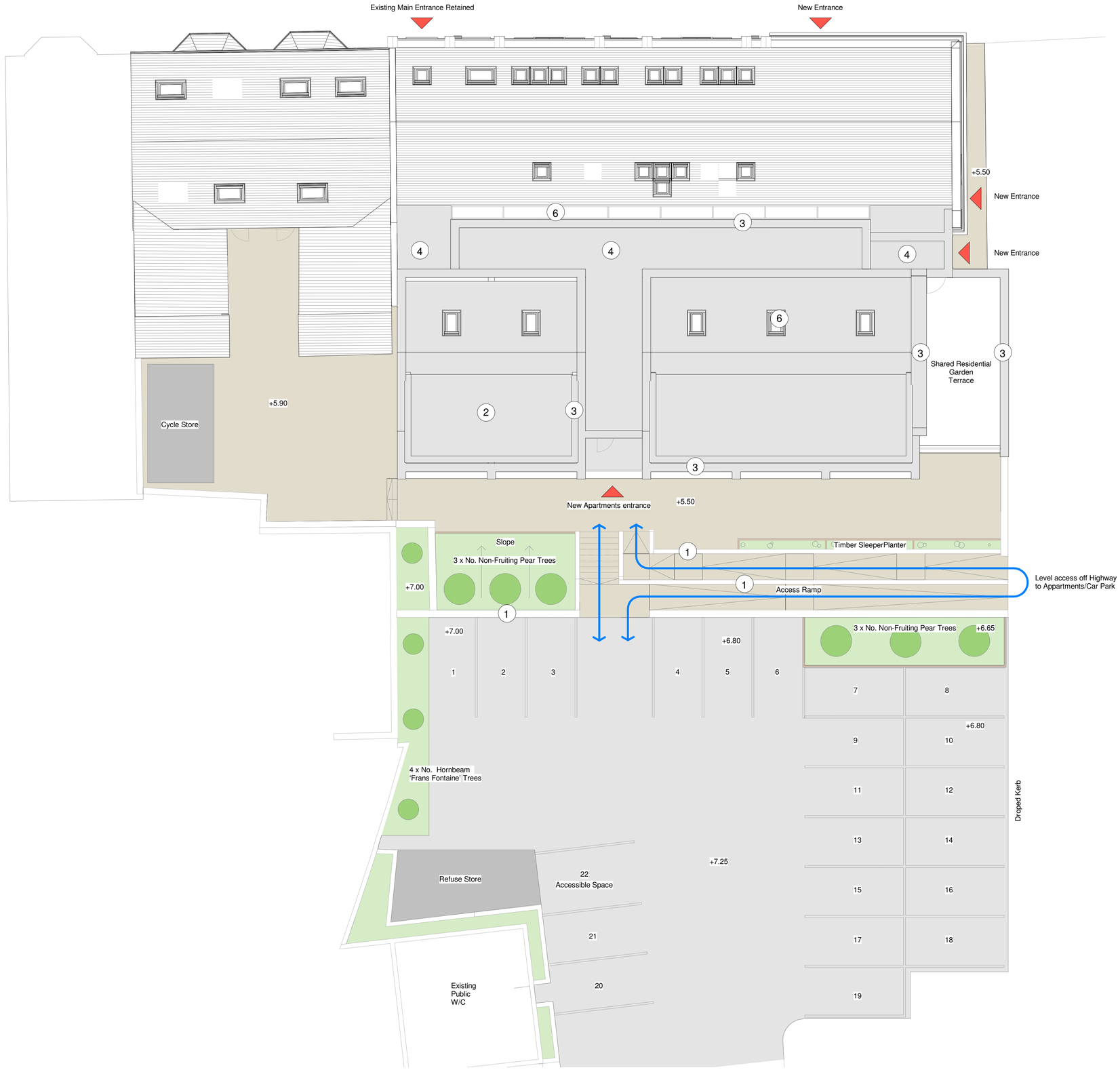
PURPOSE OF ISSUE: PRELIMINARY	STATUS: P
PROJECT: OLD FIRE STATION 6-8 NANT HALL ROAD PRESTATYN	
TITLE: DRAINAGE SCHEME EXISTING LAYOUT	
CLIENT: NANT HALL DEVELOPMENTS LTD	
DRAWN BY: RH	CHECKED BY: MM / APPROVED BY: JP
DATE: 10.05.2024	SCALE (@ A1): 1:150 / PROJECT NUMBER: 107011
DRAWING NUMBER: 0601	REV: P01

Appendix D – Site Proposals



1 **04_Roof Plan_Proposed**
1 : 100

0m 2m 4m 6m 8m
Drawing Scale 1:100 @ A1

Hard/Soft Landscaping Finishes

- Proposed Stone pavers
- Proposed Asphalt (To match existing)
- Proposed Timber sleeper planters
- Proposed Soft Landscaping/Planting
- Proposed residential Refuse/Cycle Storage zones

1. Proposed Retaining Wall. Brick Type 1. Colour: TBC
2. Proposed Metal Roof. Colour: Grey, to match existing slates.
3. Proposed Pressed Metal Coping. Colour: Grey
4. Proposed flat roof. Colour: Grey
6. Proposed Metal frame Glazing and doors. Colour: Grey. RAL TBC

Rev	Description	By	Date
P5	Minor Amendments following Arb comments	RAW	13.05.24
P4	Minor Amendments	RAW	08.05.24
P3	Landscape Development	RAW	07.05.24
P2	Preliminary Landscape scheme first issue	RAW	30.04.24
P1	First Issue	RAW	26.04.23

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Client
Nant Hall Developments Limited

Project
6-8 Nant Hall Road Redevelopment Prestatyn, LL19 9LH

Drawing Title
Site_Plan_Proposed

Drawn by	RAW	Checked by	DT	Date	26/04/24
Suitability			S3	Scale @ A1	As indicated

C+A JOB NO.	PROJECT - ORIGINATOR - VOL. - LEVEL - TYPE - ROLE - NUMBER	REV.
12203	NHR-CAA-XX-XX-DR-A-1200	P5

Appendix E – Preliminary Drainage Drawings

NANT HALL ROAD

RWPs TO THE FRONT ELEVATION DISCHARGE TO FOOTWAY OR ASSUMED DIRECT TO SEWER

EX FFL +5.90

Office Hub

Commercial Area: 285m2

Cafe/Bar

Back of House/Sanitary/Plant

Holiday Let 1 64 M2

Holiday Let 2 64 M2

Holiday Let 3 74 M2

Holiday Let 4 74 M2

Holiday Let 5 74 M2

Shared Courtyard

SJ06825905
CL Unk
IL Unk

FMH 2.1
CL 5.90
IL 5.40

FMH 1.2
CL 5.90
IL 5.30

EX MH f
CL 5.53
IL 5.28

FMH 1.1
CL 5.90
IL 5.140

FMH 1.0
CL 5.50
IL 5.00

EX MH d
CL 5.78
IL 5.38

FMH 2.0
CL 5.90
IL 5.27

EX MH c
CL Unk
IL Unk

EX MH e
CL 5.61
IL 5.06

EX MH h
CL 6.66
IL 5.41

EX MH a
CL 5.87
IL 5.22

EX MH b
CL 5.83
IL 5.305

100Ø @ 1:80

100Ø @ 1:56

150Ø @ 1:100

150Ø @ 1:100

150Ø @ 1:100

150Ø @ 1:100

100Ø

ASSUMED CONNECTION

SMH 1.5
CL 5.80
IL 5.200

SMH 1.4
CL 5.65
IL 5.105

SMH 1.3
CL 5.50
IL 4.98

SMH 1.2
CL 5.50
IL 4.905

SMH 1.1
CL 6.80
IL 4.85

SJ06826815
CL Unk
IL Unk

ASSUMED CONNECTION

ASSUMED UNMAPPED SEWER MANHOLE
CL Unk
IL Unk

PERF 100Ø

EX MH g
CL 7.09
IL Unk

CL 7.00
TOC 5.40
IL 4.825

ASSUMED CONNECTION

60m³ OF ATTENUATION CONSISTING OF AQUA CELL 'CORE-R' STORAGE BLOCKS
30 UNITS x 10 UNITS X 1 UNIT
(15m x 10m x 0.4m @ 95% VOID RATIO)
TO BE BACKFILLED & VENTED IN ACCORDANCE WITH MANUFACTURERS GUIDANCE & RECOMMENDATIONS TO CATER FOR THE 100 YEAR STORM EVENT WITH A 40% ALLOWANCE FOR CLIMATIC CHANGE

SMH 1.0
WITH FLOW CONTROL DEVICE TO LIMIT FORWARD FLOW TO 2 l/s @ 0.8m HEAD
CL 7.00
IL 4.80
(ASSUMED DEPTH TO BE CONFIRMED)

SJ06826801
CL Unk
IL Unk

SJ06826808
CL Unk
IL Unk

SJ06826907
CL 5.36
IL 3.49

SJ06826905
CL 5.33
IL 3.43

SJ06826902
CL 5.39
IL Unk

SJ06826909
CL 5.97
IL Unk

SJ06826910
CL 6.84
IL Unk

SJ06826806
CL Unk
IL Unk

SJ06826805
CL 7.43
IL Unk

Library

THE PRELIMINARY DESIGN AS DEPICTED HAS BEEN BASED ON VARIOUS ASSUMPTIONS FOLLOWING BASIC INVESTIGATION WORKS. PRIOR TO DETAILED DESIGN - A COMPLETE SURVEY OF THE EXISTING DRAINAGE SYSTEM WILL BE REQUIRED

NOTES

1. THE WORKS SHALL BE IN ACCORDANCE WITH THE FOLLOWING SPECIFICATIONS, NATIONAL BUILDING SPECIFICATION (NBS) AND SEWERS FOR ADOPTION, 7TH EDITION.
2. THIS DRAWING IS TO BE READ IN CONJUNCTION WITH ALL RELEVANT ENGINEERS DRAWINGS, ARCHITECTS DRAWINGS, MECHANICAL AND ELECTRICAL DRAWINGS AND SPECIFICATIONS.
3. THE LOCATION, LINE & LEVEL OF ALL KNOWN EXISTING BURIED SERVICE MAINS AND DRAINAGE PIPEWORK INDICATED ON THE DRAWINGS ARE APPROXIMATE AND FOR GUIDANCE PURPOSES ONLY. IT IS THE CONTRACTORS RESPONSIBILITY TO DETERMINE THEIR EXACT LINE & LEVEL, BY WAY OF HAND EXCAVATED TRIAL PITS, PRIOR TO THE COMMENCEMENT OF ANY EXCAVATION WORKS ON SITE. THE CONTRACTOR SHALL TAKE ALL NECESSARY PRECAUTIONS TO MAINTAIN THE STRUCTURAL INTEGRITY OF ALL ABOVE AND BELOW GROUND SERVICE MAINS / DRAINAGE INSTALLATIONS.
4. THE CONTRACTOR MUST COMPLY WITH ALL CURRENT LEGISLATION RELATING TO HEALTH & SAFETY.
5. THE MAIN CONTRACTOR IS RESPONSIBLE FOR THE DESIGN OF ALL TEMPORARY WORKS, AND IS ALSO RESPONSIBLE FOR THE SAFE MAINTENANCE AND STABILITY OF EXISTING BUILDINGS AT ALL TIMES.
6. THE MAIN CONTRACTOR IS RESPONSIBLE FOR THE MITIGATION OF ALL OCCURRENCES OF GROUND WATER DURING THE CONSTRUCTION PERIOD.
7. THE CONTRACTOR SHALL MAKE ALLOWANCE FOR RAISING / LOWERING ALL EXISTING ACCESS COVERS & FRAMES TO SUIT NEW FINISHED LEVELS.
8. ALL SOFT / HARD PAVED AREAS AFFECTED BY THE WORKS SHALL BE FULLY REINSTATED UPON COMPLETION OF THE WORKS. ALL SURFACE MARKINGS DAMAGED BY THE WORKS SHALL BE FULLY REINSTATED.
9. ALL SURPLUS EXCAVATED MATERIAL SHALL BE DISPOSED OF OFF SITE.
10. ALL LEVELS ARE TO ORDNANCE DATUM

KEY

- EXISTING FOUL WATER SEWER
- EXISTING SURFACE WATER SEWER
- PROPOSED FOUL DRAIN
- PROPOSED SW DRAIN
- PROPOSED FILTER DRAIN
- EXISTING DRAIN TO BE ABANDONED
- PROPOSED ATTENUATION
- PERMEABLE PAVING
- FO PROPOSED FOUL OUTLET
- RWP PROPOSED RAIN WATER DOWN PIPE

REV	DESCRIPTION	BY	CHK	APR	DATE
P02	UPDATED TO LATEST PROPOSALS	RH	MM	JP	14.05.2024

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PURPOSE OF ISSUE: PRELIMINARY	STATUS: P
PROJECT: OLD FIRE STATION, 6-8 NANT HALL ROAD, PRESTATYN	
TITLE: DRAINAGE SCHEME EXISTING LAYOUT	
CLIENT: NANT HALL DEVELOPMENTS LTD	
DRAWN BY: RH	CHECKED BY: MM / APPROVED BY: JP
DATE: 13.05.2024	SCALE (@ A1): 1:125 / PROJECT NUMBER: 107011
DRAWING NUMBER: 0602	REV: P02

Appendix F – Surface Water Calculations

Design Settings

Rainfall Methodology	FSR	Maximum Time of Concentration (mins)	30.00
Return Period (years)	100	Maximum Rainfall (mm/hr)	50.0
Additional Flow (%)	40	Minimum Velocity (m/s)	1.00
FSR Region	England and Wales	Connection Type	Level Soffits
M5-60 (mm)	17.000	Minimum Backdrop Height (m)	0.200
Ratio-R	0.400	Preferred Cover Depth (m)	1.200
CV	0.750	Include Intermediate Ground	✓
Time of Entry (mins)	4.00	Enforce best practice design rules	✓

Nodes

Name	Area (ha)	T of E (mins)	Cover Level (m)	Diameter (mm)	Easting (m)	Northing (m)	Depth (m)
Depth/Area 1	0.138	4.00	7.050		29.883	66.917	1.350
1			7.100	1200	29.913	62.489	1.638
2			7.200	1200	29.925	57.389	1.845

Links

Name	US Node	DS Node	Length (m)	ks (mm) / n	US IL (m)	DS IL (m)	Fall (m)	Slope (1:X)	Dia (mm)	T of C (mins)	Rain (mm/hr)
1.000	Depth/Area 1	1	4.428	0.600	5.700	5.537	0.163	27.2	150	4.04	50.0
1.001	1	2	5.100	0.600	5.462	5.355	0.107	47.7	225	4.08	50.0

Name	Vel (m/s)	Cap (l/s)	Flow (l/s)	US Depth (m)	DS Depth (m)	Σ Area (ha)	Σ Add Inflow (l/s)	Pro Depth (mm)	Pro Velocity (m/s)
1.000	1.939	34.3	26.2	1.200	1.413	0.138	0.0	98	2.130
1.001	1.899	75.5	26.2	1.413	1.620	0.138	0.0	91	1.728

Pipeline Schedule

Link	Length (m)	Slope (1:X)	Dia (mm)	Link Type	US CL (m)	US IL (m)	US Depth (m)	DS CL (m)	DS IL (m)	DS Depth (m)
1.000	4.428	27.2	150	Circular	7.050	5.700	1.200	7.100	5.537	1.413
1.001	5.100	47.7	225	Circular	7.100	5.462	1.413	7.200	5.355	1.620

Link	US Node	Dia (mm)	Node Type	MH Type	DS Node	Dia (mm)	Node Type	MH Type
1.000	Depth/Area 1		Junction		1	1200	Manhole	Adoptable
1.001	1	1200	Manhole	Adoptable	2	1200	Manhole	Adoptable

Simulation Settings

Rainfall Methodology	FSR	Analysis Speed	Normal
FSR Region	England and Wales	Skip Steady State	x
M5-60 (mm)	17.000	Drain Down Time (mins)	240
Ratio-R	0.400	Additional Storage (m³/ha)	20.0
Summer CV	0.750	Check Discharge Rate(s)	x
Winter CV	0.840	Check Discharge Volume	x

Storm Durations

15	60	180	360	600	960	2160	4320	7200	10080
30	120	240	480	720	1440	2880	5760	8640	

Return Period (years)	Climate Change (CC %)	Additional Area (A %)	Additional Flow (Q %)
100	40	0	0

Node 1 Online Hydro-Brake® Control

Flap Valve	x	Objective	(HE) Minimise upstream storage
Downstream Link	1.001	Sump Available	✓
Replaces Downstream Link	✓	Product Number	CTL-SHE-0067-2000-1000-2000
Invert Level (m)	5.462	Min Outlet Diameter (m)	0.100
Design Depth (m)	1.000	Min Node Diameter (mm)	1200
Design Flow (l/s)	2.0		

Node Depth/Area 1 Depth/Area Storage Structure

Base Inf Coefficient (m/hr)	0.00000	Safety Factor	2.0	Invert Level (m)	5.700
Side Inf Coefficient (m/hr)	0.00000	Porosity	0.95	Time to half empty (mins)	

Depth (m)	Area (m²)	Inf Area (m²)	Depth (m)	Area (m²)	Inf Area (m²)	Depth (m)	Area (m²)	Inf Area (m²)
0.000	150.0	0.0	0.400	150.0	0.0	0.401	0.0	0.0

Other (defaults)

Entry Loss (manhole)	0.250	Entry Loss (junction)	0.000	Apply Recommended Losses	x
Exit Loss (manhole)	0.250	Exit Loss (junction)	0.000	Flood Risk (m)	0.300

Rainfall

Event	Peak Intensity (mm/hr)	Average Intensity (mm/hr)
100 year +40% CC 15 minute summer	408.473	115.584
100 year +40% CC 15 minute winter	286.647	115.584
100 year +40% CC 30 minute summer	268.775	76.054
100 year +40% CC 30 minute winter	188.614	76.054
100 year +40% CC 60 minute summer	180.954	47.821
100 year +40% CC 60 minute winter	120.222	47.821
100 year +40% CC 120 minute summer	110.370	29.168
100 year +40% CC 120 minute winter	73.327	29.168
100 year +40% CC 180 minute summer	83.953	21.604
100 year +40% CC 180 minute winter	54.572	21.604
100 year +40% CC 240 minute summer	65.765	17.380
100 year +40% CC 240 minute winter	43.693	17.380
100 year +40% CC 360 minute summer	49.370	12.705
100 year +40% CC 360 minute winter	32.092	12.705
100 year +40% CC 480 minute summer	38.291	10.119
100 year +40% CC 480 minute winter	25.439	10.119
100 year +40% CC 600 minute summer	30.992	8.477
100 year +40% CC 600 minute winter	21.176	8.477
100 year +40% CC 720 minute summer	27.387	7.340
100 year +40% CC 720 minute winter	18.406	7.340
100 year +40% CC 960 minute summer	22.191	5.844
100 year +40% CC 960 minute winter	14.700	5.844
100 year +40% CC 1440 minute summer	15.789	4.232
100 year +40% CC 1440 minute winter	10.611	4.232
100 year +40% CC 2160 minute summer	11.070	3.059

Rainfall

Event	Peak Intensity (mm/hr)	Average Intensity (mm/hr)
100 year +40% CC 2160 minute winter	7.628	3.059
100 year +40% CC 2880 minute summer	9.060	2.428
100 year +40% CC 2880 minute winter	6.089	2.428
100 year +40% CC 4320 minute summer	6.697	1.751
100 year +40% CC 4320 minute winter	4.410	1.751
100 year +40% CC 5760 minute summer	5.418	1.387
100 year +40% CC 5760 minute winter	3.507	1.387
100 year +40% CC 7200 minute summer	4.536	1.157
100 year +40% CC 7200 minute winter	2.928	1.157
100 year +40% CC 8640 minute summer	3.910	0.998
100 year +40% CC 8640 minute winter	2.524	0.998
100 year +40% CC 10080 minute summer	3.448	0.880
100 year +40% CC 10080 minute winter	2.226	0.880

Results for 100 year +40% CC Critical Storm Duration. Lowest mass balance: 100.00%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
180 minute winter	Depth/Area 1	176	6.098	0.398	17.6	57.5874	0.0000	SURCHARGED
180 minute winter	1	176	6.098	0.636	8.4	0.7192	0.0000	SURCHARGED
15 minute summer	2	1	5.355	0.000	2.0	0.0000	0.0000	OK

Link Event (Upstream Depth)	US Node	Link	DS Node	Outflow (l/s)	Velocity (m/s)	Flow/Cap	Link Vol (m³)	Discharge Vol (m³)
180 minute winter	Depth/Area 1	1.000	1	8.4	1.001	0.247	0.0780	
180 minute winter	1	Hydro-Brake®	2	2.0				41.4

Appendix G – O&M Manual

Prestatyn

OLD FIRE STATION

Maintenance Plan

107011-RP-D-0002

Rev: P01

May 2024

JPS CIVIL + STRUCTURAL ENGINEERS

Table 1: SuDS Maintenance Inspection Checklist

GENERAL INFORMATION			
Site ID	Former Fire Station,		
Site Location and co-ordinates (GIS if appropriate)	Nant Hall Road, Prestatyn, LL19 9LL (306635, 382911)		
Elements forming the SuDS scheme	Permeable Paving / Attenuation	**Approved Drawing Reference(s)**	-
Inspection frequency	Annual	**Approved Specification Reference**	-
Type of development	Residential / commercial	**Specific purpose of any parts of the scheme (e.g. biodiversity, wildlife and visual aspects)**	-
Agreements Restrictions			
Discharge Type	**Connection**	**Outflow**	**Agreement**
Surface Water	To Public Sewer	2 l/s	S106
Foul	To Public Sewer	4 L/s	S106

	Inspection date				Inspection date			
	Details	**Y/N**	**Action required**	**Date Completed**	**Details**	**Y/N**	**Action required**	**Date Completed**
GENERAL INSPECTION ITEMS								
Is there any evidence of erosion, channelling, ponding (where not desirable) or other poor hydraulic performance?								
Is there any evidence of accidental spillages, oils, poor water quality, odours, nuisance insects?								
Have any health and safety risks been identified to either the public or maintenance operatives?								
Is there any deterioration in the surface of permeable or porous surfaces (e.g. rutting, spreading of blocks or signs of ponding water)?								

	Inspection date				Inspection date			
	Details	**Y/N**	**Action required**	**Date Completed**	**Details**	**Y/N**	**Action required**	**Date Completed**
SILT/SEDIMENT ACCUMULATION								
Does permeable or porous surfacing require sweeping to remove silt?								
SYSTEM BLOCKAGES / LITTER BUILD UP								
Is there evidence of litter accumulation in the system? If yes, is this a blockage risk?								
Is there any evidence of any other clogging/blockage of outlets or drainage paths?								
INFRASTRUCTURE								
Is there any evidence of cross connections or other unauthorised inflows?								
Is there any evidence of tampering with the flow controls?								
Is there any evidence of tampering with the Attenuation Tanks?								
Are Attenuation tank vents clear?								
Are gullies/channels/kerb drainage clear of debris/detritus?								
Are Rainwater Down Pipes and gutters clear of debris /detritus?								
Drainage network to be checked CCTV survey. A list of defects should be compiled with high, medium and low risk of failure. High risk defects should be fixed immediately, medium risk should be fixed within 6 months and low risk to be monitored.								

Are there any other matters that could affect the performance of the system in relation to the design objectives for hydraulic, water quality, biodiversity and visual aspects? (Specify.)								
OTHER OBSERVATIONS								
Information appended (e.g. photos)								

	Inspection date				Inspection date			
	Details	**Y/N**	**Action required**	**Date Completed**	**Details**	**Y/N**	**Action required**	**Date Completed**
SUITABILITY OF CURRENT MAINTENANCE REGIME								
Continue as current Increase maintenance Decrease maintenance								
NEXT INSPECTION								
Proposed date for next inspection								

Additional Notes