

DRAINAGE STRATEGY REPORT

Client: Hale Construction

Project: Phase 5 Crymlyn Grove

Issue date: 24.02.2025

Job No: C1600

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Introduction

This Drainage Technical Note has been prepared to support a planning submission for the development of 153 new residential units at Crymlyn Parc, Skewen, Neath Port Talbot, SA10 6EF.

Existing Site

The proposed development site is located off Crymlyn Parc, Skewen, SA10 6EF, as demonstrated within Figure 1, with the site classified as a portion of greenfield land. The site is bound by residential areas both to the south (Crymlyn Parc) and east (Cae Morfa), as well as a portion of farmland to the west. To the north of the site, a small area of farmland is present, along with a railway and a small watercourse.

Proposed Development Site

Foul Drainage

It is proposed that all foul flows are to be collected within a gravitational network, proposed for adoption with DCWW subject to S104 approval. Due to the local topography a pumping station is proposed on site, with a final connection to be made to the existing foul water network located within Crymlyn Parc, south of the development site. Confirmation from DCWW has been received as part of a pre-planning application (PPA0005601) confirming capacity for the connection of foul flows to the existing network.

Surface Water Drainage

SuDS Approving Bodies (SAB's) agreement will be required in accordance with the Flood and Water Management act 2010 (Schedule 3).

The standards for this agreement are listed below:

- S1 – Surface Water Runoff Destination
- S2 – Surface Water Runoff Hydraulic Control
- S3 – Water Quality
- S4 – Amenity
- S5 – Biodiversity
- S6 – Design of Drainage for Construction, Operation and Maintenance

S1 - Surface Water Runoff Destination

Collection for use

Surface water runoff from the site is proposed to be reused through the hydration of planting within the variety of proposed SuDS features across the site, including proposed planted raingardens collecting highway flows as well as raised planters on each property. In addition to this rain water butts are also to be provided per plot.

Infiltration Methods

Initial soakaway testing was undertaken on site in April 2021, in accordance with BRE365, by Terra Firma (report ref: 110521-16595-01). Testing demonstrated that negligible reductions in water level and as such infiltration rates were found to be too low to be calculated. As such infiltration could not be considered a viable primary source of discharge from the proposed development site. Please refer to Appendix A for demonstration of the location and results of all soakaway tests conducted.

Discharge to Surface Water Body

As infiltration could not be deemed a viable primary source of discharge for the site, a positive connection has instead been proposed to a local watercourse identified to the north of the site. Based upon the existing topography and infiltration results for the site, it would appear likely that surface water runoff from the existing would likely flow overland towards this watercourse at present, as such the proposed strategy would look to replicate existing conditions. Please refer to Appendix B for a wider context plan demonstrating the proposed connection location within context of the wider surrounding area.

Discharge to Surface Water Sewer

Based upon the above, the option should not be required.

Discharge to Combined Sewer

Based upon the above, the option should not be required.

S2 – Surface Water Runoff Hydraulic Control

This standard requires surface water to be managed to prevent as far as possible any discharge from the development for rainfall events less than 5mm. The surface water runoff rate and volume for up to a 1 in 100-year return period plus 30% climate change should be managed to protect people, properties, and the receiving water body. Refer to Appendix C for a Drainage Strategy Plan for the proposed development. Initial design calculation to support the sizing of the proposed attenuation system can be seen in Appendix D.

Surface water interception aims to mimic greenfield conditions by preventing runoff from the majority of small rainfall events. This is to be catered for across the site within a variety of SuDS features, including rain gardens, permeable surfaces and the use of both a detention basin.

All surface water flows are to be attenuated on site, with final discharge to the existing watercourse located north of the site at a controlled rate of 13.3L/s, based upon the greenfield Q1 runoff rate of 5.24L/s/Ha.

Through the attenuation of flows on site to the Q1 greenfield runoff rate, significant betterment can be seen with regards to discharge rates to the existing watercourse for all return periods of greater than one year by comparison to that of existing conditions. In addition when comparing pre-development volumetric runoff to that of the post-development volumetric discharge, significant betterment can be

seen for all shorter storm events, introducing a time delay to the discharge of flows from site, and thereby helping to reduce loading of the downstream system. Please see Appendix A for comparison of pre-development and post-development rates and volumes.

S3 – Water Quality

This standard requires treatment of surface water runoff to prevent negative impacts on the receiving water quality and/or protect downstream drainage systems including sewers.

The aim of the surface water management strategy with regards to water quality is to use natural processes that promote biodiversity and long-term sustainability. As such, it employs a SuDS management train approach, providing drainage components in series.

In accordance with Table G3.1 from the Statutory Standards, the level of hazard will typically be classified as Low Hazard. Pollution is to be mitigated across the site, through a SuDS train consisting of on plot treatment within raised planters and permeable surfaces, highway treatment through the use of permeable surfaces and raingardens, before discharge of all flows from site into a proposed detention basin with accompanying cellular storage to achieve the required storage capacity on site.

S4 – Amenity

This standard requires that the design of the surface water management system should maximize amenity benefits.

The primary amenity focus of the SuDS scheme should be to improve the health and well-being of the users. The scheme will need to be based on natural forms that mimic natural landscapes found within the region. Other key amenity benefits should include improving air quality around the development, increasing carbon sequestration, and improving water quality through removal of pollutants.

S5 – Biodiversity

This standard requires that the surface water management system should maximize biodiversity benefits.

The SuDS scheme biodiversity strategy should revolve around the creation of significant and varied habitat to increase the overall biodiversity of the site and ecological value. The inclusion of plant species that will enhance the general eco system and simultaneously act as a water filtration system to clean pollutants and contaminants should be used and where possible provide meandering swales and a large detention basin to maximize the variety of habitats available.

S6 – Design of Drainage for Construction and Maintenance and Structural Integrity

The surface water drainage system should be designed with the overriding ethos of simplicity in construction, use and maintenance. This then allows a very simple translation from the principles described within standard S6, namely that all elements of the surface water drainage system should be designed so that they can be constructed, as well as maintained and operated easily, safely and cost-effectively.

Information with regards to the construction methodology and requirements of the proposed system will be developed as part of the detailed design stage of the project, likewise the maintenance requirements and regime of the proposed system will be developed into the full maintenance strategy for the site during the next phase of design development.

Potable Water Supply

Under a DwrCymruWelshWater pre-planning application dated April 2021, ref. PPA0005601, it was highlighted that that a Hydraulic Modelling Assessment (HMA) will be required to establish the capacity within the system. The HMA was developed by DCWW and a final report issued in June 2023.

The development team is currently engaging with DCWW to progress the detail design of the HMA solution. A prestart meeting was held on the 28th of January 2025 to discuss the onsite proposals, program and any additional information that DCWW may require. As the development team is engaging with DCWW to progress the HMA, it is understood that DCWW will not object to the development proposals.

Summary

The proposed site will be a fully gravitational surface water drainage system, and separate gravitational foul network with a final pumped connection to the existing public sewerage network located within Crymlyn Parc.

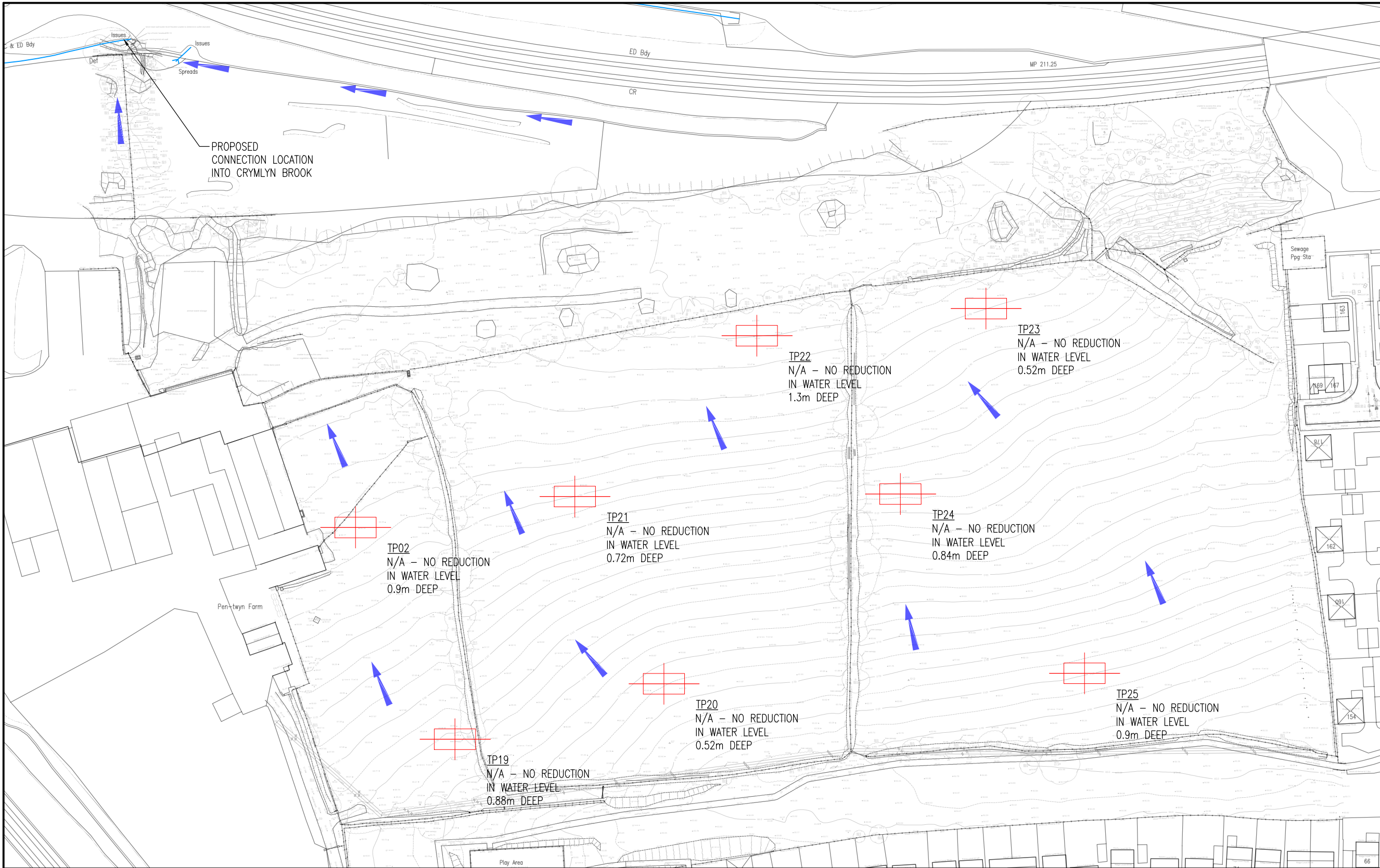
All on site sewer systems will be designed and constructed in accordance with the latest edition of “Sewers for Adoption” and any of the adopting authority’s (DCWW) specific requirements.

The aim of the surface water drainage strategy is to mimic the natural catchment process as closely as possible, and the proposed system will need to be designed in accordance with the statutory “Sustainable Drainage Systems Standards for Wales” and any local authority’s SAB requirements.

On site surface water attenuation strategies will help to restrict resultant discharge to the neighboring watercourse, providing significant betterment in discharge rates for all storm events greater than a 1 year return period, as well as significant volumetric betterment for all short storm durations by comparison to existing conditions.

Appendix A

Surface Water Discharge Location



- GENERAL NOTES
- DO NOT SCALE THIS DRAWING.
 - CONTRACTOR TO CHECK ALL DIMENSIONS AND REPORT ALL ERRORS AND OMISSIONS TO THE ENGINEER.
 - ANY DISCREPANCY TO BE REPORTED IMMEDIATELY TO THE ENGINEER.
 - THIS DRAWING TO BE READ IN CONJUNCTION WITH ALL RELEVANT ARCHITECTS, SUBCONTRACTORS AND SPECIALISTS DRAWINGS AND SPECIFICATIONS.

KEY

INFILTRATION TEST RESULTS AS PER TERRA FIRMA REPORT 110521-16595-01 - APRIL 2021

EXISTING DIRECTION OF OVERLAND FLOW

A	PROPOSED POST DEVELOPMENT DISCHARGE RATE AMENDED	TE	31.10.24
Rev.	Detail	By	Date

Revisions

Reinforcement schedules nos.

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Client

Hale

Project

PHASE 5 RESIDENTIAL DEVELOPMENT AT CRYMLYN GROVE, SKEWEN

Drawing Title

SURFACE WATER DISCHARGE LOCATION

INFORMATION

Project No. C1600	Drawing No. C-SK13	Revision A
Scales 1:1250	Date 06.09.24	Sheet Size A3
Drawn TE	Checked DH	

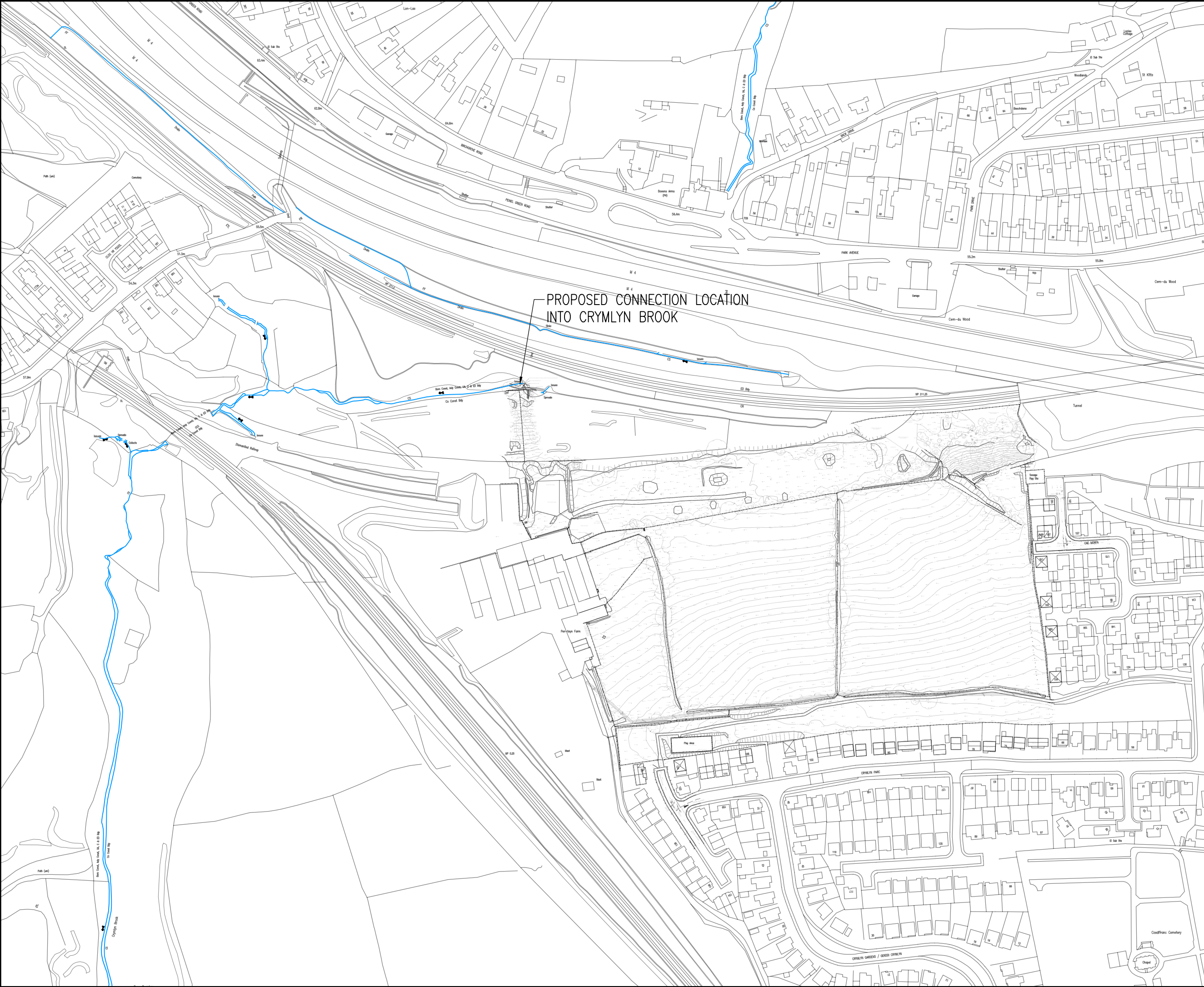
SITE DISCHARGE RATE COMPARISON

STORM RETURN PERIOD (360min WINTER)	PRE-DEVELOPMENT GREENFIELD RUNOFF RATE	POST-DEVELOPMENT MAXIMUM DISCHARGE RATE	PERCENTAGE BETTERMENT PROVIDED
1 YR	13.3 L/s	13.3 L/s	0%
30 YR	25.9 L/s	13.3 L/s	48.6%
100 YR	31.8 L/s	13.3 L/s	58.2%

SITE VOLUMETRIC DISCHARGE COMPARISON

STORM DURATION (100 YEARS)	PRE-DEVELOPMENT GREENFIELD RUNOFF	POST-DEVELOPMENT VOLUMETRIC DISCHARGE	PERCENTAGE BETTERMENT PROVIDED
15min	169.4m ³	5.7m ³	96.6%
120min	527.6m ³	155.6m ³	70.5%
360min	827.3m ³	391.0m ³	52.7%
720min	1071.0m ³	825.3m ³	22.9%
1440min	1390.5m ³	1708.5m ³	-22.9%
2880min	1858.5m ³	2381.1m ³	-28.1%

Appendix B
Wider Site Context Plan



- GENERAL NOTES
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Rev.	Detail	By	Date
Revisions			
Reinforcement schedules nos.			



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Client



Project

PHASE 5 RESIDENTIAL
DEVELOPMENT AT
CRYMLYN GROVE, SKEWEN

Drawing Title

WIDER SITE
CONTEXT PLAN

INFORMATION	
Project No. C1600	Drawing No. C-SK12
Scales 1:2500	Date 06.09.24
Drawn TE	Checked DH
Sheet Size A3	Revision —

Appendix C
Proposed Drainage Strategy Plan

SURFACE WATER DRAINAGE
WIDER DRAINAGE STRATEGY

- DURING THE SITE INVESTIGATION SIX SOAKAWAY TESTS WERE UNDERTAKEN IN ACCORDANCE WITH BRE DG 365:2016. DUE TO A SLOW RATE OF INFILTRATION AND IN SOME CIRCUMSTANCES THE TEST PIT EMPTYING OVERNIGHT, INFILTRATION RATES COULD NOT BE DETERMINED. REFER TO SITE INVESTIGATION REPORT REF:110521-16505-01 BY TERRAFIRMA.
- RAINGARDENS PROVIDED WITHIN THE WIDER HIGHWAY CORRIDOR TO COLLECT AND CONVEY SURFACE WATER FLOWS.
- DETENTION BASIN PROPOSED WITHIN THE NORTH-WESTERN CORNER OF THE SITE, WITH FLOWS TO BE ATTENUATED ON SITE PRIOR TO DISCHARGE TO THE LOCAL WATERCOURSE.
- ATTENUATED DESIGN BASED ON A GREENFIELD RUNOFF RATE EQUATING TO 5.24l/sec/ha
- PROPOSED FINAL DISCHARGE RATE BASED ON THE GREENFIELD RUNOFF RATE EQUATES TO 13.3l/sec.

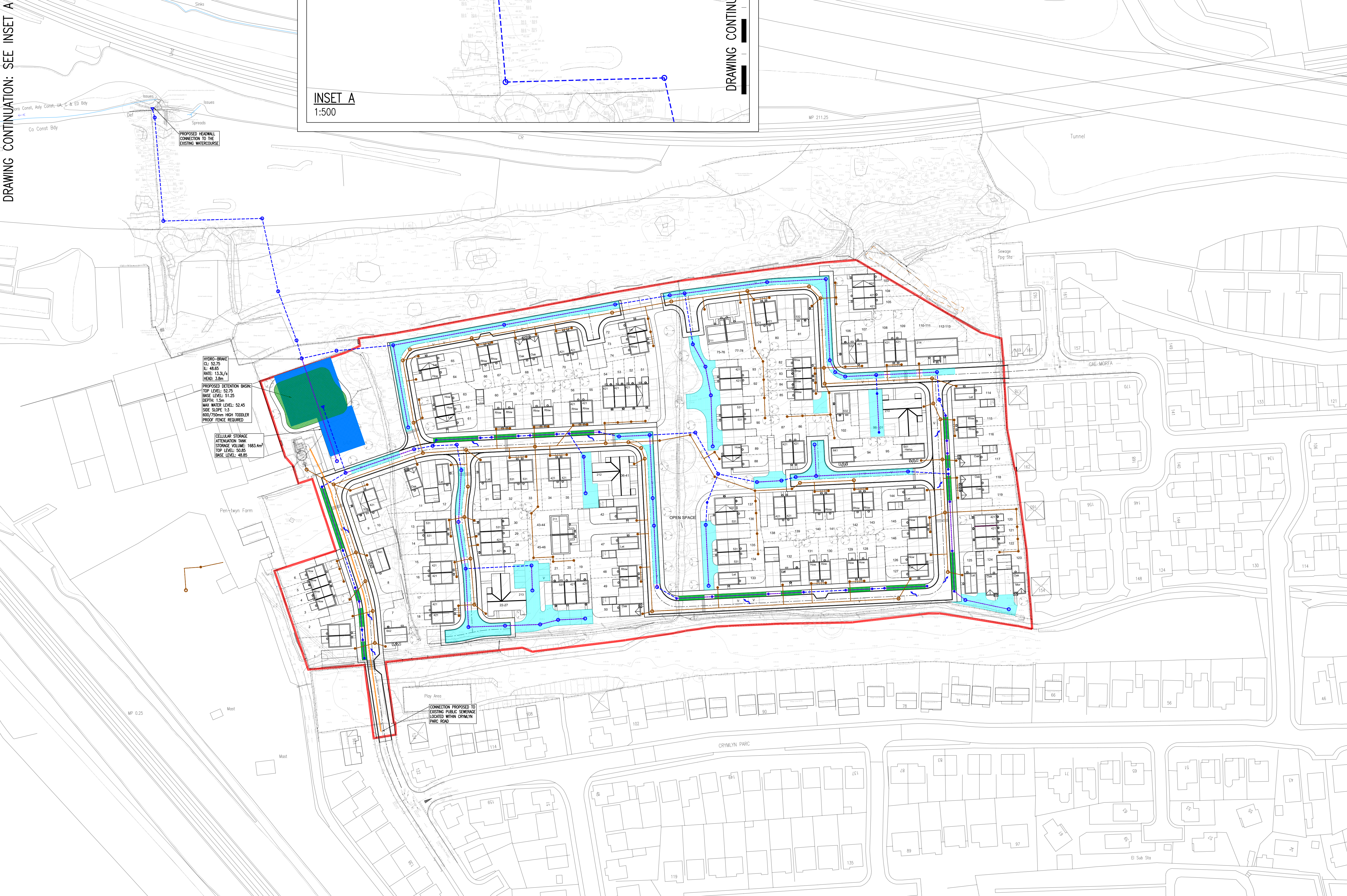
PLOT DRAINAGE STRATEGY

- ALL SHARED DRIVEWAYS AND INDIVIDUAL PLOT PARKING BAYS TO BE PERMEABLY SURFACED
- RAISED PLANTERS AND RAIN WATER BUTTS TO BE PROVIDED PER PLOT (LOCATIONS TO BE CONFIRMED WITH ARCHITECT)
- WHERE POSSIBLE SURFACE WATER FLOWS ARE TO BE DISCHARGED DIRECTLY FROM DOWNPIPES TO ADJACENT POROUS SURFACES THROUGH THE USE OF FILTER/DIFFUSER UNITS
- PERMEABLE SHARED DRIVEWAYS WILL BE SUBJECT TO SAB ADOPTION

FOUL WATER DRAINAGE

- FOUL GRAVITY SYSTEM TO SERVE THE PLOTS, DISCHARGING INTO A FINAL DCWW ADOPTED PUMPING STATION. RISING MAIN TO CONNECT INTO THE ADOPTED SYSTEM IN CRYMLYN PARC ROAD.

DRAWING CONTINUATION: SEE INSET A



INSET A
1:500

DRAWING CONTINUATION: SEE MAIN PLAN

- GENERAL NOTES**
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- KEY**
- PROPOSED STORM DRAINAGE PIPEWORK
 - - - PROPOSED STORM DRAINAGE PERFORATED PIPEWORK
 - - - DCWW FOUL DRAINAGE
 - 90mmø O/D HPPE SDR17
 - ADOPTABLE RISING MAIN
 - PERMEABLE SURFACING
 - PROPOSED RAINGARDENS
 - PROPOSED DETENTION BASIN
 - PROPOSED ATTENUATION TANK

Rev.	Detail	By	Date
G	RED LINE BOUNDARY AMENDED	JC	20.02.25
F	STRATEGY REVISED TO REFLECT LATEST SITE LAYOUT	JC	03.02.25
E	STRATEGY REVISED TO SUIT LATEST SITE PROPOSALS	TE	17.10.24
D	DRAWING AMENDED TO SUIT COMMENTS	AJ	03.03.23
C	DRAWING AMENDED TO SUIT COMMENTS	LO	11.05.21
B	DRAINAGE STRATEGY AMENDED TO REFLECT UPDATED ARCHITECT LAYOUT.	DH	05.05.21
A	WESTERN BASIN OMITTED, NORTHERN DRAINAGE ARRANGEMENT AMENDED.	DH	05.03.21

Reinforcement schedules nos.

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Hale

Project
PHASE 5 RESIDENTIAL DEVELOPMENT AT CRYMLYN GROVE, SKEWEN

Drawing Title
PROPOSED DRAINAGE STRATEGY

PRELIMINARY

Project No.	Drawing No.
C1600	C-SK03
Scales 1:500	Date 04.03.21
Drawn CH	Checked DH
Sheet Size A1	Revision G

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Appendix D
Preliminary Surface Water Calculations

CB3 Consult Ltd		Page 1																																																																																																																																																																																																																																																																																		
7 St James Crescent Swansea Wales SA1 6DP		Phase 5 Crymlyn Grove Surface Water Drianage 100yr +30% CC																																																																																																																																																																																																																																																																																		
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Summary of Results for 100 year Return Period (+30%) Half Drain Time : 1580 minutes. <table><thead><tr><th>Storm Event</th><th>Max Level (m)</th><th>Max Depth (m)</th><th>Max Infiltration (l/s)</th><th>Max Control (l/s)</th><th>Max Σ Outflow (l/s)</th><th>Max Volume (m³)</th><th>Status</th></tr></thead><tbody><tr><td>15 min Summer</td><td>49.398</td><td>0.548</td><td>0.0</td><td>9.7</td><td>9.7</td><td>461.0</td><td>O K</td></tr><tr><td>30 min Summer</td><td>49.627</td><td>0.777</td><td>0.0</td><td>9.7</td><td>9.7</td><td>654.2</td><td>O K</td></tr><tr><td>60 min Summer</td><td>49.902</td><td>1.052</td><td>0.0</td><td>9.7</td><td>9.7</td><td>885.7</td><td>O K</td></tr><tr><td>120 min Summer</td><td>50.207</td><td>1.357</td><td>0.0</td><td>9.7</td><td>9.7</td><td>1142.4</td><td>O K</td></tr><tr><td>180 min Summer</td><td>50.381</td><td>1.531</td><td>0.0</td><td>9.7</td><td>9.7</td><td>1288.4</td><td>O K</td></tr><tr><td>240 min Summer</td><td>50.497</td><td>1.647</td><td>0.0</td><td>9.7</td><td>9.7</td><td>1386.5</td><td>O K</td></tr><tr><td>360 min Summer</td><td>50.662</td><td>1.812</td><td>0.0</td><td>9.8</td><td>9.8</td><td>1525.2</td><td>O K</td></tr><tr><td>480 min Summer</td><td>50.769</td><td>1.919</td><td>0.0</td><td>10.1</td><td>10.1</td><td>1615.6</td><td>O K</td></tr><tr><td>600 min Summer</td><td>50.843</td><td>1.993</td><td>0.0</td><td>10.2</td><td>10.2</td><td>1677.2</td><td>O K</td></tr><tr><td>720 min Summer</td><td>51.442</td><td>2.592</td><td>0.0</td><td>11.5</td><td>11.5</td><td>1714.4</td><td>O K</td></tr><tr><td>960 min Summer</td><td>51.625</td><td>2.775</td><td>0.0</td><td>11.8</td><td>11.8</td><td>1749.6</td><td>O K</td></tr><tr><td>1440 min Summer</td><td>51.641</td><td>2.791</td><td>0.0</td><td>11.9</td><td>11.9</td><td>1752.9</td><td>O K</td></tr><tr><td>2160 min Summer</td><td>51.501</td><td>2.651</td><td>0.0</td><td>11.6</td><td>11.6</td><td>1725.1</td><td>O K</td></tr><tr><td>2880 min Summer</td><td>51.347</td><td>2.497</td><td>0.0</td><td>11.3</td><td>11.3</td><td>1698.6</td><td>O K</td></tr><tr><td>4320 min Summer</td><td>50.805</td><td>1.955</td><td>0.0</td><td>10.2</td><td>10.2</td><td>1645.3</td><td>O K</td></tr><tr><td>5760 min Summer</td><td>50.724</td><td>1.874</td><td>0.0</td><td>10.0</td><td>10.0</td><td>1577.4</td><td>O K</td></tr><tr><td>7200 min Summer</td><td>50.642</td><td>1.792</td><td>0.0</td><td>9.8</td><td>9.8</td><td>1507.9</td><td>O K</td></tr><tr><td>8640 min Summer</td><td>50.559</td><td>1.709</td><td>0.0</td><td>9.7</td><td>9.7</td><td>1438.2</td><td>O K</td></tr><tr><td>10080 min Summer</td><td>50.477</td><td>1.627</td><td>0.0</td><td>9.7</td><td>9.7</td><td>1369.7</td><td>O K</td></tr><tr><td>15 min Winter</td><td>49.466</td><td>0.616</td><td>0.0</td><td>9.7</td><td>9.7</td><td>518.2</td><td>O K</td></tr></tbody></table> <table><thead><tr><th>Storm Event</th><th>Rain (mm/hr)</th><th>Flooded Volume (m³)</th><th>Discharge Volume (m³)</th><th>Time-Peak (mins)</th></tr></thead><tbody><tr><td>15 min Summer</td><td>100.177</td><td>0.0</td><td>474.9</td><td>26</td></tr><tr><td>30 min Summer</td><td>71.226</td><td>0.0</td><td>675.7</td><td>41</td></tr><tr><td>60 min Summer</td><td>48.563</td><td>0.0</td><td>921.0</td><td>70</td></tr><tr><td>120 min Summer</td><td>31.869</td><td>0.0</td><td>1209.9</td><td>130</td></tr><tr><td>180 min Summer</td><td>24.389</td><td>0.0</td><td>1389.0</td><td>190</td></tr><tr><td>240 min Summer</td><td>20.023</td><td>0.0</td><td>1520.8</td><td>248</td></tr><tr><td>360 min Summer</td><td>15.165</td><td>0.0</td><td>1543.5</td><td>368</td></tr><tr><td>480 min Summer</td><td>12.421</td><td>0.0</td><td>1546.4</td><td>486</td></tr><tr><td>600 min Summer</td><td>10.626</td><td>0.0</td><td>1550.5</td><td>606</td></tr><tr><td>720 min Summer</td><td>9.346</td><td>0.0</td><td>1564.0</td><td>724</td></tr><tr><td>960 min Summer</td><td>7.620</td><td>0.0</td><td>1595.8</td><td>962</td></tr><tr><td>1440 min Summer</td><td>5.697</td><td>0.0</td><td>1656.7</td><td>1244</td></tr><tr><td>2160 min Summer</td><td>4.243</td><td>0.0</td><td>2900.7</td><td>1644</td></tr><tr><td>2880 min Summer</td><td>3.440</td><td>0.0</td><td>3114.6</td><td>2052</td></tr><tr><td>4320 min Summer</td><td>2.565</td><td>0.0</td><td>2899.4</td><td>2944</td></tr><tr><td>5760 min Summer</td><td>2.084</td><td>0.0</td><td>3801.6</td><td>3800</td></tr><tr><td>7200 min Summer</td><td>1.777</td><td>0.0</td><td>4046.9</td><td>4616</td></tr><tr><td>8640 min Summer</td><td>1.561</td><td>0.0</td><td>4267.1</td><td>5448</td></tr><tr><td>10080 min Summer</td><td>1.401</td><td>0.0</td><td>4469.3</td><td>6256</td></tr><tr><td>15 min Winter</td><td>100.177</td><td>0.0</td><td>532.1</td><td>26</td></tr></tbody></table>				Storm Event	Max Level (m)	Max Depth (m)	Max Infiltration (l/s)	Max Control (l/s)	Max Σ Outflow (l/s)	Max Volume (m³)	Status	15 min Summer	49.398	0.548	0.0	9.7	9.7	461.0	O K	30 min Summer	49.627	0.777	0.0	9.7	9.7	654.2	O K	60 min Summer	49.902	1.052	0.0	9.7	9.7	885.7	O K	120 min Summer	50.207	1.357	0.0	9.7	9.7	1142.4	O K	180 min Summer	50.381	1.531	0.0	9.7	9.7	1288.4	O K	240 min Summer	50.497	1.647	0.0	9.7	9.7	1386.5	O K	360 min Summer	50.662	1.812	0.0	9.8	9.8	1525.2	O K	480 min Summer	50.769	1.919	0.0	10.1	10.1	1615.6	O K	600 min Summer	50.843	1.993	0.0	10.2	10.2	1677.2	O K	720 min Summer	51.442	2.592	0.0	11.5	11.5	1714.4	O K	960 min Summer	51.625	2.775	0.0	11.8	11.8	1749.6	O K	1440 min Summer	51.641	2.791	0.0	11.9	11.9	1752.9	O K	2160 min Summer	51.501	2.651	0.0	11.6	11.6	1725.1	O K	2880 min Summer	51.347	2.497	0.0	11.3	11.3	1698.6	O K	4320 min Summer	50.805	1.955	0.0	10.2	10.2	1645.3	O K	5760 min Summer	50.724	1.874	0.0	10.0	10.0	1577.4	O K	7200 min Summer	50.642	1.792	0.0	9.8	9.8	1507.9	O K	8640 min Summer	50.559	1.709	0.0	9.7	9.7	1438.2	O K	10080 min Summer	50.477	1.627	0.0	9.7	9.7	1369.7	O K	15 min Winter	49.466	0.616	0.0	9.7	9.7	518.2	O K	Storm Event	Rain (mm/hr)	Flooded Volume (m³)	Discharge Volume (m³)	Time-Peak (mins)	15 min Summer	100.177	0.0	474.9	26	30 min Summer	71.226	0.0	675.7	41	60 min Summer	48.563	0.0	921.0	70	120 min Summer	31.869	0.0	1209.9	130	180 min Summer	24.389	0.0	1389.0	190	240 min Summer	20.023	0.0	1520.8	248	360 min Summer	15.165	0.0	1543.5	368	480 min Summer	12.421	0.0	1546.4	486	600 min Summer	10.626	0.0	1550.5	606	720 min Summer	9.346	0.0	1564.0	724	960 min Summer	7.620	0.0	1595.8	962	1440 min Summer	5.697	0.0	1656.7	1244	2160 min Summer	4.243	0.0	2900.7	1644	2880 min Summer	3.440	0.0	3114.6	2052	4320 min Summer	2.565	0.0	2899.4	2944	5760 min Summer	2.084	0.0	3801.6	3800	7200 min Summer	1.777	0.0	4046.9	4616	8640 min Summer	1.561	0.0	4267.1	5448	10080 min Summer	1.401	0.0	4469.3	6256	15 min Winter	100.177	0.0	532.1	26
Storm Event	Max Level (m)	Max Depth (m)	Max Infiltration (l/s)	Max Control (l/s)	Max Σ Outflow (l/s)	Max Volume (m³)	Status																																																																																																																																																																																																																																																																													
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180 min Summer	50.381	1.531	0.0	9.7	9.7	1288.4	O K																																																																																																																																																																																																																																																																													
240 min Summer	50.497	1.647	0.0	9.7	9.7	1386.5	O K																																																																																																																																																																																																																																																																													
360 min Summer	50.662	1.812	0.0	9.8	9.8	1525.2	O K																																																																																																																																																																																																																																																																													
480 min Summer	50.769	1.919	0.0	10.1	10.1	1615.6	O K																																																																																																																																																																																																																																																																													
600 min Summer	50.843	1.993	0.0	10.2	10.2	1677.2	O K																																																																																																																																																																																																																																																																													
720 min Summer	51.442	2.592	0.0	11.5	11.5	1714.4	O K																																																																																																																																																																																																																																																																													
960 min Summer	51.625	2.775	0.0	11.8	11.8	1749.6	O K																																																																																																																																																																																																																																																																													
1440 min Summer	51.641	2.791	0.0	11.9	11.9	1752.9	O K																																																																																																																																																																																																																																																																													
2160 min Summer	51.501	2.651	0.0	11.6	11.6	1725.1	O K																																																																																																																																																																																																																																																																													
2880 min Summer	51.347	2.497	0.0	11.3	11.3	1698.6	O K																																																																																																																																																																																																																																																																													
4320 min Summer	50.805	1.955	0.0	10.2	10.2	1645.3	O K																																																																																																																																																																																																																																																																													
5760 min Summer	50.724	1.874	0.0	10.0	10.0	1577.4	O K																																																																																																																																																																																																																																																																													
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Storm Event	Rain (mm/hr)	Flooded Volume (m³)	Discharge Volume (m³)	Time-Peak (mins)																																																																																																																																																																																																																																																																																
15 min Summer	100.177	0.0	474.9	26																																																																																																																																																																																																																																																																																
30 min Summer	71.226	0.0	675.7	41																																																																																																																																																																																																																																																																																
60 min Summer	48.563	0.0	921.0	70																																																																																																																																																																																																																																																																																
120 min Summer	31.869	0.0	1209.9	130																																																																																																																																																																																																																																																																																
180 min Summer	24.389	0.0	1389.0	190																																																																																																																																																																																																																																																																																
240 min Summer	20.023	0.0	1520.8	248																																																																																																																																																																																																																																																																																
360 min Summer	15.165	0.0	1543.5	368																																																																																																																																																																																																																																																																																
480 min Summer	12.421	0.0	1546.4	486																																																																																																																																																																																																																																																																																
600 min Summer	10.626	0.0	1550.5	606																																																																																																																																																																																																																																																																																
720 min Summer	9.346	0.0	1564.0	724																																																																																																																																																																																																																																																																																
960 min Summer	7.620	0.0	1595.8	962																																																																																																																																																																																																																																																																																
1440 min Summer	5.697	0.0	1656.7	1244																																																																																																																																																																																																																																																																																
2160 min Summer	4.243	0.0	2900.7	1644																																																																																																																																																																																																																																																																																
2880 min Summer	3.440	0.0	3114.6	2052																																																																																																																																																																																																																																																																																
4320 min Summer	2.565	0.0	2899.4	2944																																																																																																																																																																																																																																																																																
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7 St James Crescent Swansea Wales SA1 6DP			Phase 5 Crymlyn Grove Surface Water Drianage 100yr +30% CC				
Date 17/10/2024 File Tank + Basin Calc.SRCX			Designed by TE Checked by DH				
XP Solutions			Source Control 2020.1.3				
<u>Summary of Results for 100 year Return Period (+30%)</u>							
Storm Event	Max Level (m)	Max Depth (m)	Max Infiltration (l/s)	Max Control (l/s)	Max Σ Outflow (l/s)	Max Volume (m³)	Status
30 min Winter	49.725	0.875	0.0	9.7	9.7	736.1	O K
60 min Winter	50.035	1.185	0.0	9.7	9.7	997.1	O K
120 min Winter	50.380	1.530	0.0	9.7	9.7	1288.1	O K
180 min Winter	50.580	1.730	0.0	9.7	9.7	1455.9	O K
240 min Winter	50.715	1.865	0.0	10.0	10.0	1570.0	O K
360 min Winter	51.534	2.684	0.0	11.7	11.7	1731.3	O K
480 min Winter	51.938	3.088	0.0	12.4	12.4	1832.9	O K
600 min Winter	52.115	3.265	0.0	12.7	12.7	1903.1	O K
720 min Winter	52.231	3.381	0.0	12.9	12.9	1952.8	O K
960 min Winter	52.358	3.508	0.0	13.1	13.1	2011.1	O K
1440 min Winter	52.412	3.562	0.0	13.2	13.2	2037.4	O K
2160 min Winter	52.348	3.498	0.0	13.1	13.1	2006.5	O K
2880 min Winter	52.240	3.390	0.0	12.9	12.9	1956.8	O K
4320 min Winter	51.996	3.146	0.0	12.5	12.5	1855.1	O K
5760 min Winter	51.662	2.812	0.0	11.9	11.9	1757.3	O K
7200 min Winter	50.835	1.985	0.0	10.2	10.2	1670.7	O K
8640 min Winter	50.697	1.847	0.0	9.9	9.9	1554.8	O K
10080 min Winter	50.564	1.714	0.0	9.7	9.7	1442.6	O K
Storm Event	Rain (mm/hr)	Flooded Volume (m³)	Discharge Volume (m³)	Time-Peak (mins)			
30 min Winter	71.226	0.0	756.9	41			
60 min Winter	48.563	0.0	1033.3	70			
120 min Winter	31.869	0.0	1355.1	128			
180 min Winter	24.389	0.0	1535.5	186			
240 min Winter	20.023	0.0	1546.0	244			
360 min Winter	15.165	0.0	1561.9	360			
480 min Winter	12.421	0.0	1593.1	476			
600 min Winter	10.626	0.0	1623.9	592			
720 min Winter	9.346	0.0	1654.9	706			
960 min Winter	7.620	0.0	1718.0	928			
1440 min Winter	5.697	0.0	1789.5	1352			
2160 min Winter	4.243	0.0	3247.9	1692			
2880 min Winter	3.440	0.0	3315.1	2164			
4320 min Winter	2.565	0.0	3149.4	3076			
5760 min Winter	2.084	0.0	4255.6	3984			
7200 min Winter	1.777	0.0	4534.9	4976			
8640 min Winter	1.561	0.0	4779.7	5880			
10080 min Winter	1.401	0.0	5004.3	6760			
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7 St James Crescent Swansea Wales SA1 6DP	Phase 5 Crymlyn Grove Surface Water Drianage 100yr +30% CC	
Date 17/10/2024 File Tank + Basin Calc.SRCX	Designed by TE Checked by DH	
XP Solutions		
Source Control 2020.1.3		

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7 St James Crescent Swansea Wales SA1 6DP	Phase 5 Crymlyn Grove Surface Water Drianage 100yr +30% CC	
Date 17/10/2024 File Tank + Basin Calc.SRCX	Designed by TE Checked by DH	
XP Solutions Source Control 2020.1.3		

Model Details

Storage is Online Cover Level (m) 52.750

Complex Structure

Cellular Storage

Invert Level (m) 48.850 Safety Factor 2.0
Infiltration Coefficient Base (m/hr) 0.00000 Porosity 0.95
Infiltration Coefficient Side (m/hr) 0.00000

Depth (m)	Area (m ²)	Inf. Area (m ²)	Depth (m)	Area (m ²)	Inf. Area (m ²)
0.000	886.0	886.0	1.300	886.0	1040.8
0.100	886.0	897.9	1.400	886.0	1052.7
0.200	886.0	909.8	1.500	886.0	1064.6
0.300	886.0	921.7	1.600	886.0	1076.5
0.400	886.0	933.6	1.700	886.0	1088.4
0.500	886.0	945.5	1.800	886.0	1100.3
0.600	886.0	957.4	1.900	886.0	1112.2
0.700	886.0	969.3	2.000	886.0	1124.1
0.800	886.0	981.3	2.001	0.0	1124.2
0.900	886.0	993.2	2.200	0.0	1124.2
1.000	886.0	1005.1	2.300	0.0	1124.2
1.100	886.0	1017.0	2.400	0.0	1124.2
1.200	886.0	1028.9	2.500	0.0	1124.2

Tank or Pond

Invert Level (m) 51.250

Depth (m)	Area (m ²)	Depth (m)	Area (m ²)	Depth (m)	Area (m ²)	Depth (m)	Area (m ²)
0.000	145.6	0.600	249.9	0.601	355.4	1.500	581.0

Hydro-Brake® Optimum Outflow Control

Unit Reference MD-SHE-0130-1330-3800-1330
Design Head (m) 3.800
Design Flow (l/s) 13.3
Flush-Flo™ Calculated
Objective Minimise upstream storage
Application Surface
Sump Available Yes
Diameter (mm) 130
Invert Level (m) 48.650
Minimum Outlet Pipe Diameter (mm) 150
Suggested Manhole Diameter (mm) 1500

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7 St James Crescent	Phase 5 Crymlyn Grove	
Swansea	Surface Water Drrianage	
Wales SA1 6DP	100yr +30% CC	
Date 17/10/2024	Designed by TE	
File Tank + Basin Calc.SRCX	Checked by DH	
XP Solutions	Source Control 2020.1.3	

Hydro-Brake® Optimum Outflow Control

Control Points	Head (m)	Flow (l/s)
Design Point (Calculated)	3.800	13.3
Flush-Flo™	0.558	9.7
Kick-Flo®	1.157	7.6
Mean Flow over Head Range	-	10.0

The hydrological calculations have been based on the Head/Discharge relationship for the Hydro-Brake® Optimum as specified. Should another type of control device other than a Hydro-Brake Optimum® be utilised then these storage routing calculations will be invalidated

Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)
0.100	4.7	1.200	7.7	3.000	11.9	7.000	17.8
0.200	8.2	1.400	8.3	3.500	12.8	7.500	18.4
0.300	9.0	1.600	8.8	4.000	13.6	8.000	19.0
0.400	9.5	1.800	9.3	4.500	14.4	8.500	19.5
0.500	9.6	2.000	9.8	5.000	15.1	9.000	20.1
0.600	9.6	2.200	10.3	5.500	15.8	9.500	20.6
0.800	9.4	2.400	10.7	6.000	16.5		
1.000	8.7	2.600	11.1	6.500	17.2		