

Title: Waterfalls Country Centre - Drainage Strategy
for Planning – P05

Date: Sept 2024

I. Introduction

Jubb have been instructed by Andrew Scott Ltd to provide engineering input relating to drainage for the proposed Waterfall Country Centre visitor hub development at Pontneddfachen, Neath.

The proposed development is located on the southside of Pontneathvaughan Road and westly adjacent the River Neath. The proposals for the site are to construct a community/visitor hub, associated parking and landscaping arrangement.

As part of the advancement in Sustainable Drainage Systems (SuDS), legislature was implemented on 7th January 2019 in Wales to enforce Schedule 3 of the flood and Water management Act 2020. Neath Port Talbot Council would look to review and approve any surface water drainage design proposed for the development, in line with the CIRIA C753 'The SuDS Manual' and any additional information provided by the approving body.

A separate SAB pre-application has been submitted to Neath Port Talbot Council and a SAB full application will be submitted for approval of the proposed surface water drainage strategy outlined below prior to the start of construction.

The proposed development is approximately 1.2ha in size and located on National Grid Reference centered on National Grid Reference 290072 E; 207570 N. The site currently consists of grassed agricultural fields and a number of farm out buildings.

II. Drainage Strategy

a. Proposed Surface Water Drainage

Pontneathvaughan Road:

Minor alterations are proposed to the highway alignment of Pontneathvaughan Road and specifically its junction with High Street adjacent to the Angel Inn. Due to the nature of the changes the proposed changes to surface water drainage are minimal and therefore proposed to alter existing road gully positions to accommodate the changes however the principles of the stormwater drainage are to remain as existing. This strategy is to be confirmed via the SAB pre-discussions.

Refer to Area 05 - Existing & Proposed Drainage Works 2081-05-JUB-C-DR-00540-S2 for reference.

Proposed Car Park and visitor facilities:

The scheme is subject to SAB approval. Based on current geotechnical information, the surface water runoff is proposed to infiltrate to ground. There is an existing Dwr Cymru Welsh Water 600mm potable water main which crosses the site in a north to south direction. Agreement has been reached with DCWW that unlined permeable pavement is allowable over the existing

Drainage Strategy

watermain and that a dedicated service zone will not be required through the pavement construction.

Additional soakaway testing will be required prior to construction to confirm the current strategy. The preliminary testing results contained within the Ground Conditions Assessment report 23158-JCE-XX-XX-RP-GE-001-P1 identify Infiltration rates of between $9.477\text{E-}05$ and $3.70\text{E-}05$ m/sec.

Should additional soakaway testing find that percolation results are insufficient to accommodate disposal of surface water runoff by infiltration, it may be necessary to discharge surface water to the adjacent River Neath. The greenfield rate for the entire site has been determined from ReFH2 as 23.6 l/s for the 1 in 1 year storm. Discharge rate would be limited to a figure proportional to the catchment area requiring a discharge to the river.

Proposed attenuation storage will be in the form of permeable paving and two SuDS basins. Additional SuDS features in the form of raingardens and filter strips are proposed to be located adjacent hardstanding areas to the buildings and at sides to the access roads. The drainage system has been sized to accommodate all storm events up to and including 100 year + 40% climate change.

In the event that further testing identifies that the infiltration rate is unsuitable to accommodate the proposed design or that groundwater levels prevent infiltration then the stormwater will be discharged to the River Neath by a shallow ditch and restricted to greenfield run off rates via a suitable flow control device. Details for this ditch are to be confirmed should it be required.

Proposed Foul Water Drainage

The proposed foul network will utilise a gravity system within the site before entering an onsite Private Package Pumping Station (PPS). The PPS will subsequently cross the Pontneathvaughan Road and connect to an off-site Dwr Cymru Welsh Water (DCWW) foul sewer chamber reference SN90070650. A pre-application has been conducted with DCWW under reference PPA0008547 to confirm the connection point and capacity within the existing network for the development.

During public consultations associated with the development, a local resident has raised concern over flooding incidents associated with the Pontneddfechan Sewage Treatment works located to the southeast of the development at the southern end of Mellte Avenue. DCWW through the pre-application correspondence responded with the following statement *'our operations team have confirmed that they're not aware of any flooding issues at Pontneddfechan treatment works'*.

III. SuDS Strategy

The SuDS features proposed have been selected based on the mitigation index values given within Table 26.2 & 26.3 of CIRIA SuDS Manual. The polluting features on the site are the building roof & hardstanding, considered to be a very low or low hazard for pollution, and the access road and carpark, also considered to be a low hazard for pollution.

Drainage Strategy

a. Building Roof

The building roofs will drain via rainwater pipes which are predominantly designed to be directed via surface level linear channels which discharge into rain gardens to provide treatment and interception for the first 5mm of the surface water.

b. Car Parking Area

The trafficked areas are proposed to drain to permeable paving within the car park. The permeable paving provides interception for the first 5mm of surface water runoff and treatment. The northernmost element of carpark is designed to accommodate bus movements within the aisles. Pavement for the aisle will need to be of heavy duty construction which cannot be achieved in a permeable asphalt. Permeable sub-base will continue below that impermeable surfacing and by in hydraulic continuity with the permeable parking bays adjoining. The use of infiltration in this area means that interception can be achieved despite the surface not being entirely permeable.

c. Road

The proposed access road to the car park will fall towards adjacent under-drained swales, raingardens and areas of permeable paving which will provide interception for the first 5mm of surface water runoff and treatment. The swales and raingardens do not achieve the required ratio of contributing area to base area alone, however they discharge to the basin at the south of the site where there is sufficient base area to make up the deficit.

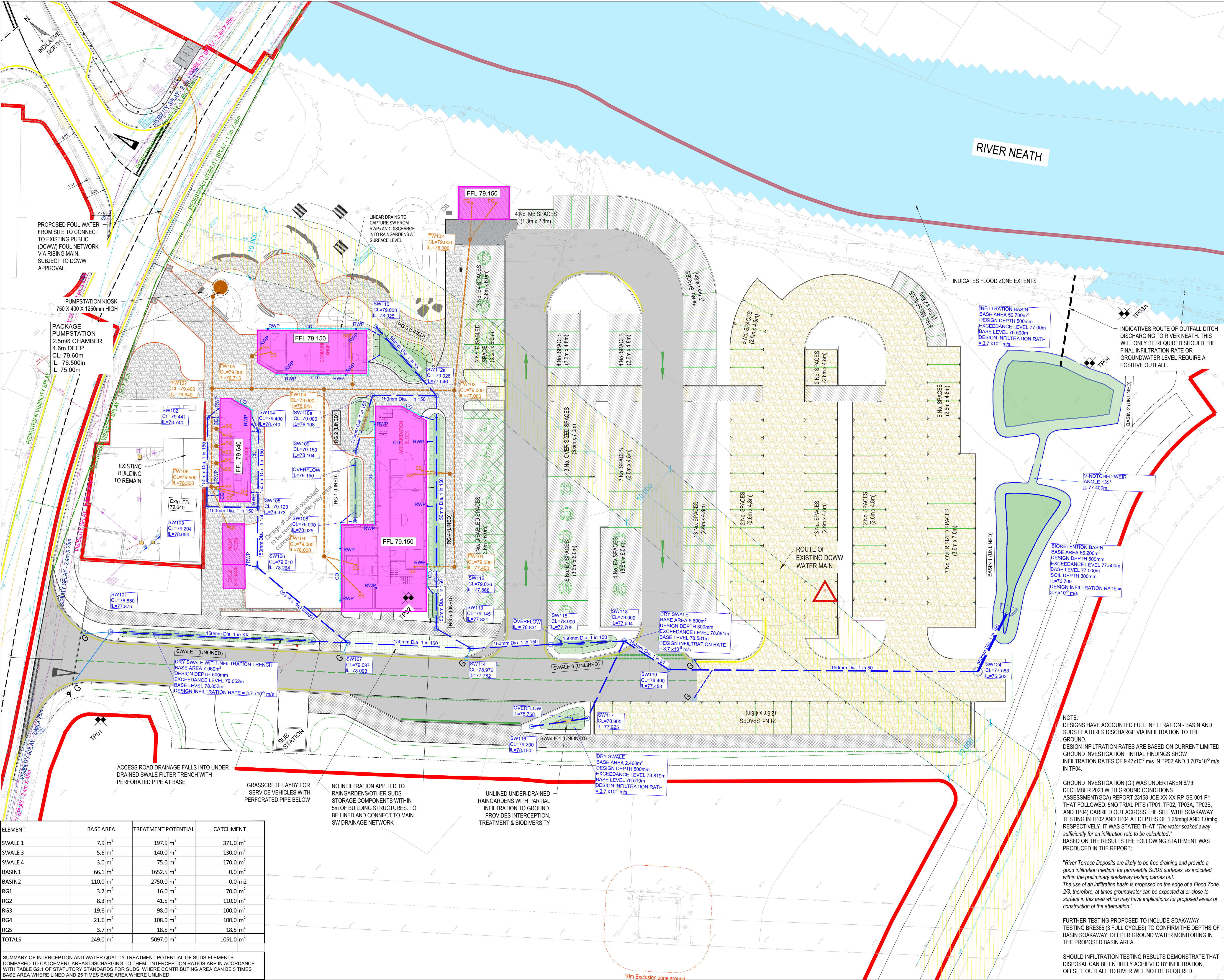
d. Hardstanding/Footpath

The majority of hardstanding and footpaths are of unlined permeable construction. Footpath adjacent to the incoming road is designed to fall towards rain gardens to provide treatment and interception.

The proposed SuDS features will be used in series where possible therefore a weighted mitigation index for treatment will be used. The proposed SuDS features will be managed in line with the Operation & Maintenance Strategy which will form part of the full SAB submission.

Refer to Proposed Area 04 - Drainage Strategy Layout 2081-04-JUB-C-DR-00500-S2 for reference.

Appendix A – 2081-04-JUB-C-DR-00500-S2 – Area 04 - Proposed Drainage Layout



ELEMENT	BASE AREA	TREATMENT POTENTIAL	CATCHMENT
SWALE 1	7.9 m ²	197.5 m ³	371.0 m ²
SWALE 3	5.6 m ²	140.0 m ³	130.0 m ²
SWALE 4	3.0 m ²	75.0 m ³	170.0 m ²
BASIN 1	66.1 m ²	1652.5 m ³	0.0 m ²
BASIN 2	110.0 m ²	2750.0 m ³	0.0 m ²
RG1	3.2 m ²	16.0 m ³	70.0 m ²
RG2	8.3 m ²	41.5 m ³	110.0 m ²
RG3	19.6 m ²	98.0 m ³	100.0 m ²
RG4	21.6 m ²	108.0 m ³	100.0 m ²
RG5	3.7 m ²	18.5 m ³	18.5 m ²
TOTALS	249.0 m ²	5097.0 m ³	1051.0 m ²

SUMMARY OF INTERCEPTION AND WATER QUALITY TREATMENT POTENTIAL OF SUDS ELEMENTS COMPARED TO CATCHMENT AREAS DISCHARGING TO THEM. INTERCEPTION RATIOS ARE IN ACCORDANCE WITH TABLE G2.1 OF STATUTORY STANDARDS FOR SUDS. WHERE CONTRIBUTING AREA CAN BE 5 TIMES BASE AREA WHERE LINED AND 25 TIMES BASE AREA WHERE UNLINED.

NOTES

- THIS DRAWING IS TO BE READ IN CONJUNCTION WITH AND CONSTRUCTED IN ACCORDANCE WITH ALL RELEVANT ENGINEERING DRAWINGS AND DETAILS.
- FOR EXISTING SERVICES APPARATUS LOCATIONS REFER TO JUBB DRAWING.
- ALL DIMENSIONS IN METRES UNLESS NOTED OTHERWISE. ALL LEVELS IN METRES UNLESS NOTED OTHERWISE.
- DO NOT SCALE THIS DRAWING. ALL DIMENSIONS MUST BE CHECKED/ VERIFIED ON SITE. IF IN DOUBT ASK.
- ANY DISCREPANCIES NOTED ON SITE ARE TO BE REPORTED TO THE ENGINEER IMMEDIATELY.
- DRAWING DEVELOPED FOR PLANNING PURPOSES ONLY AND THE LAYOUT IS INDICATIVE ONLY.
- DESIGN HAS BEEN MADE FOR DISCHARGE VIA INFILTRATION BASED ON FINDINGS IN GROUND CONDITIONS ASSESSMENT REPORT 23158-JCE-XX-XX-RP-GE-001-P1. SOAKAWAY TESTING TO BRE365 MUST BE CARRIED PRIOR TO CONFIRM LOCATIONS OF INFILTRATION FEATURES ACHIEVE ACCEPTABLE RATES FOR DISCHARGE INTO THE GROUND AT THE DESIGNED DEPTHS.
- IF INFILTRATION RATES ARE CONFIRMED THERE IS ALSO A REQUIREMENT OF GROUNDWATER MONITORING TO CONFIRM DISCHARGE AT THE DESIGN SOAKAWAY LEVEL WILL NOT ENCOUNTER GROUNDWATER.
- LOCATIONS FOR DRAIN CONNECTIONS TO RWP'S AND FOUL WATER POP-UP SHOWN ON LAYOUT AS INDICATIVE.

KEY

- PROPOSED SURFACE WATER DRAIN
- PROPOSED FOUL WATER DRAIN
- PROPOSED PERFORATED UNDER DRAIN PIPE
- PROPOSED FOUL RISING MAIN
- PROPOSED CHANNEL DRAIN
- ROOF AREA - TRADITIONAL CONSTRUCTION
- IMPERMEABLE ASPHALT CONCRETE CARRIAGEWAY
- IMPERMEABLE ASPHALT CONCRETE CARRIAGEWAY SURFACING WITH OPEN GRADED SUB-BASE BELOW. HYDRAULICALLY CONNECTED TO SUB-BASE OF ADJACENT PERMEABLE PAVING.
- IMPERMEABLE ASPHALT CONCRETE FOOTWAY
- PERMEABLE GRAVEL FILLED PLASTIC GRID PAVING
- PERMEABLE RESIN BOUND PAVING
- PROPOSED PERMEABLE ASPHALT CONCRETE
- HEAVY-DUTY GRASSCRETE (OSA)
- RAINGARDEN / SWALE, UNDER-DRAINED
- HEADWALL
- EASEMENT
- EXISTING RIVER NEATH FLOOD EXTENTS

P7	10.09.24	Headwall removed. Outfall ditch added.	JM	EH
P8	09.09.24	Issued for planning approval.	JM	EH
P5	28.08.24	Updated layout and surfacing	KP	GS
P4	09.07.24	Updated to revised layout	EH	GS
P3	20.06.24	Updated to revised site layout	EH	GS

Rev Date Description By Apvd

PROJECT:
PROPOSED VISITOR HUB @
WATERFALL COUNTRY,
PONTNEDDFACHEN, NEATH

TITLE:
PROPOSED DRAINAGE LAYOUT
AREA 04 - PROPOSED CAR PARK

CLIENT:
ANDREW SCOTT

SCALE@A1:
1:250

PROJECT REF:
23158

DRAWING No:
2081-04-JUB-C-DR-00500

STATUS:
S2

REV:
P07

Revision Referencing
P = Preliminary A = Approval T = Tender C = Construction

NOTE:
DESIGNS HAVE ACCOUNTED FULL INFILTRATION - BASIN AND SUDS FEATURES DISCHARGE VIA INFILTRATION TO THE GROUND.
DESIGN INFILTRATION RATES ARE BASED ON CURRENT LIMITED GROUND INVESTIGATION. INITIAL FINDINGS SHOW INFILTRATION RATES OF 9.47x10⁻⁵ m/s IN TP02 AND 3.707x10⁻⁶ m/s IN TP04.

GROUND INVESTIGATION (GI) WAS UNDERTAKEN 6/TH DECEMBER 2023 WITH GROUND CONDITIONS ASSESSMENT(GCA) REPORT 23158-JCE-XX-XX-RP-GE-001-P1 THAT FOLLOWED. SNO TRIAL PITS (TP01, TP02, TP03A, TP03B, AND TP04) CARRIED OUT ACROSS THE SITE WITH SOAKAWAY TESTING IN TP02 AND TP04 AT DEPTHS OF 1.25mbgl AND 1.0mbgl RESPECTIVELY. IT WAS STATED THAT "The water soaked away sufficiently for an infiltration rate to be calculated." BASED ON THE RESULTS THE FOLLOWING STATEMENT WAS PRODUCED IN THE REPORT:

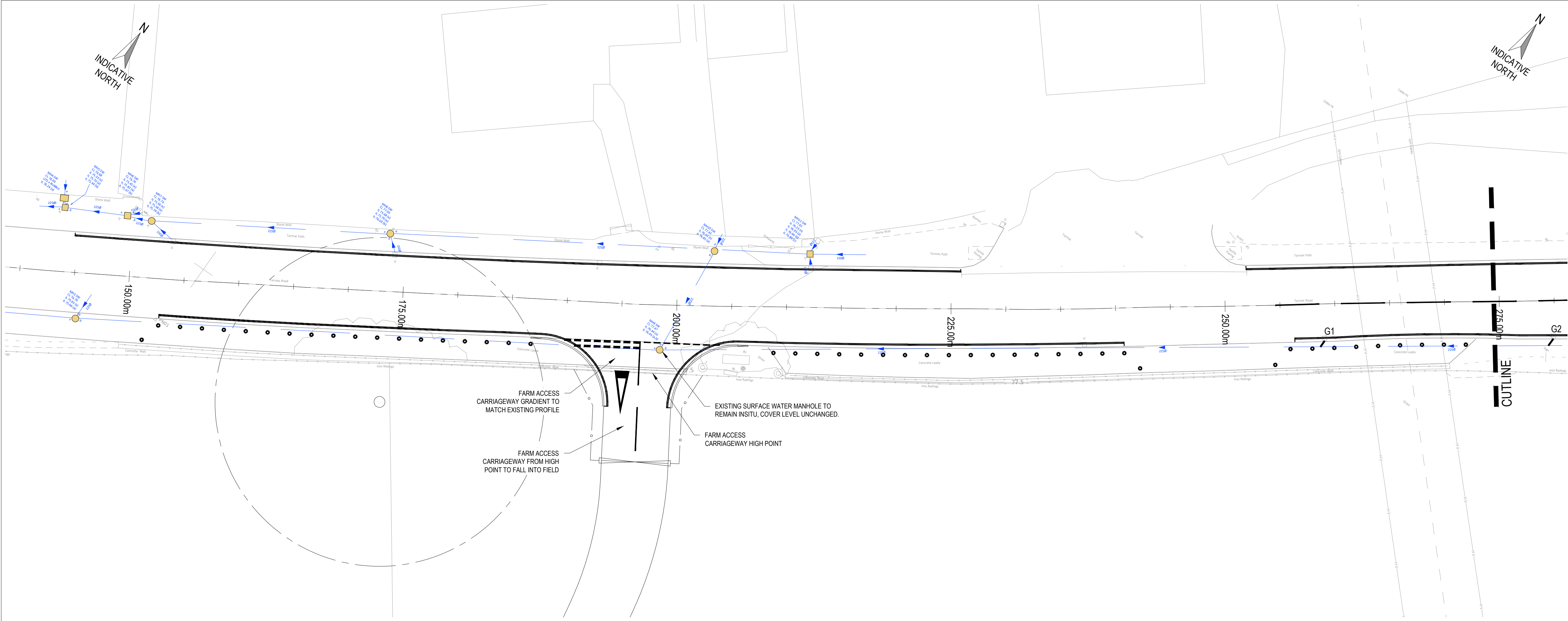
"River Terrace Deposits are likely to be free draining and provide a good infiltration medium for permeable SUDS surfaces, as indicated within the preliminary soakaway testing carries out. The use of an infiltration basin is proposed on the edge of a Flood Zone 2/3, therefore, at times groundwater can be expected at or close to surface in this area which may have implications for proposed levels or construction of the attenuation."

FURTHER TESTING PROPOSED TO INCLUDE SOAKAWAY TESTING BRE365 (3 FULL CYCLES) TO CONFIRM THE DEPTHS OF BASIN SOAKAWAY. DEEPER GROUND WATER MONITORING IN THE PROPOSED BASIN AREA.

SHOULD INFILTRATION TESTING RESULTS DEMONSTRATE THAT DISPOSAL CAN BE ENTIRELY ACHIEVED BY INFILTRATION, OFFSITE OUTFALL TO RIVER WILL NOT BE REQUIRED.

Bristol, Cardiff, Plymouth, Winchester
2A Oak Tree Court, Cardiff Gate Business Park, Cardiff
jubb uk.com
+44(0)292 052 4444

**Appendix B – 2081-05-JUB-C-DR-00540-S2 – Existing & Proposed Highway Works - Area 05 -
Proposed Highway Drainage Layout**

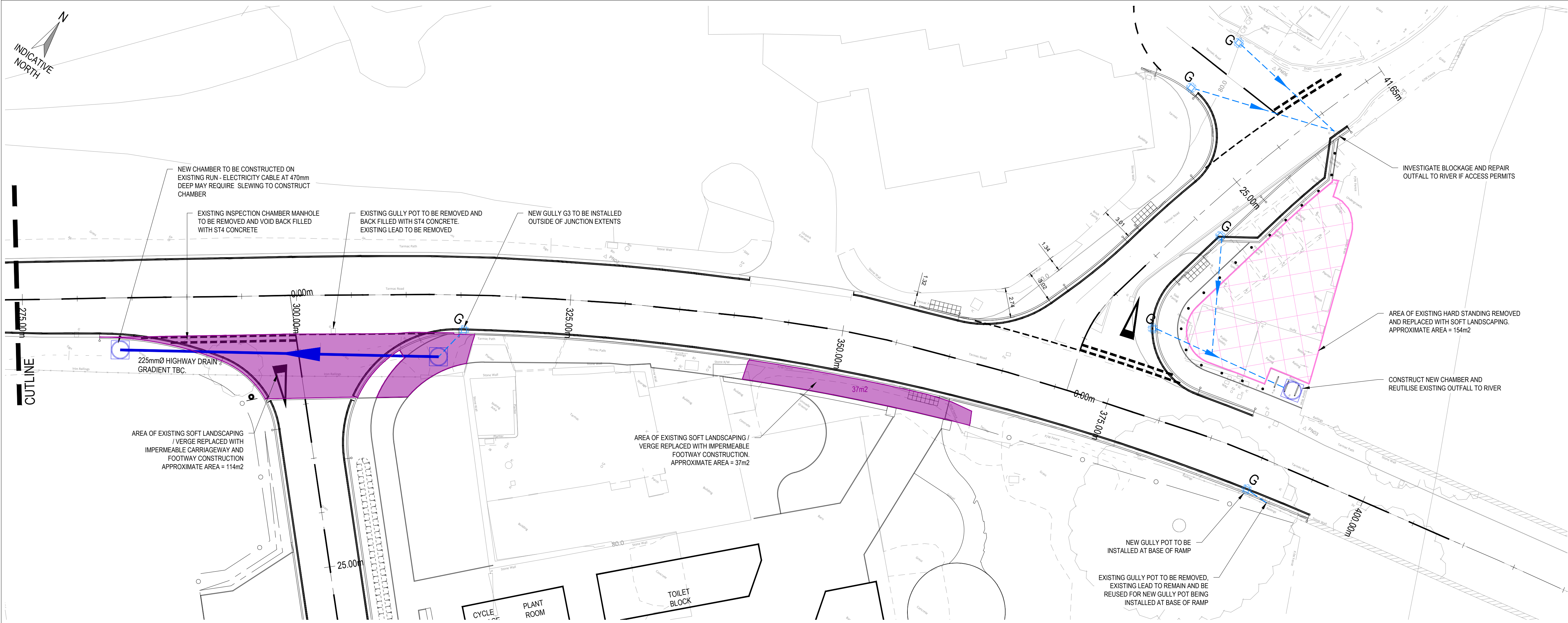


NOTES

- THIS DRAWING IS TO BE READ IN CONJUNCTION WITH AND CONSTRUCTED IN ACCORDANCE WITH ALL RELEVANT ENGINEERING DRAWINGS AND DETAILS.
- FOR EXISTING SERVICES APPARATUS LOCATIONS REFER TO JUBB DRAWING.
- ALL DIMENSIONS IN METRES UNLESS NOTED OTHERWISE. ALL LEVELS IN METRES UNLESS NOTED OTHERWISE.
- DO NOT SCALE THIS DRAWING. ALL DIMENSIONS MUST BE CHECKED/ VERIFIED ON SITE. IF IN DOUBT ASK.
- ANY DISCREPANCIES NOTED ON SITE ARE TO BE REPORTED TO THE ENGINEER IMMEDIATELY.
- EXISTING UTILITY INFORMATION TAKEN FROM LANDMARK SYRVEYS PROJECT 6765 DATED NOVEMBER 2023.
- THIS INFORMATION IS BASED UPON STATUTORY AUTHORITY ASSET RECORDS & TOPOGRAPHICAL SURVEY DATA TOGETHER WITH SURVEY INFORMATION & MAY THEREFORE BE INCOMPLETE OR INACCURATE.
- EXISTING GULLY DATA TAKEN FROM ANDREW SCOTT CONTRACTORS ON SITE SURVEYS - MARCH 2024.
- TOTAL AREA OF ADDITIONAL HARD PAVING 151m². EXISTING HARD PAVING TURNED TO SOFT / PERMEABLE SURFACING = 154m²

KEY

- Proposed surface water sewer
- Gully
- Foul Water Sewer
- Combined Water Sewer
- Surface Water Sewer
- Utility Survey Extents
- Other



P05	28.08.24	Updated layout	KP	GS
P04	09.07.24	Layout revised to align with landscape architects layout. additional double yellow lines shown with emergency layby.	JE	GS
P03	21.06.24	Layout revised to align with landscape architects layout.	JE	GS
P2	23.04.24	Revised layout	KP	GS
P1	28.03.24	First issue	JE	GS
Rev	Date	Description	By	Apvd

PROJECT:
PROPOSED VISITOR HUB @
WATERFALL COUNTRY,
PONTNEDDFACHEN, NEATH

TITLE:
EXISTING & PROPOSED DRAINAGE WORKS
AREA 05 - PROPOSED HIGHWAY WORKS

CLIENT:
ANDREW SCOTT

SCALE@A1:
1:250

PROJECT REF:
23158

DRAWING No:
2081-05-JUB-C-DR-00540

STATUS:
S2

REV:
P05

Revision Referencing
P = Preliminary A = Approval T = Tender C = Construction